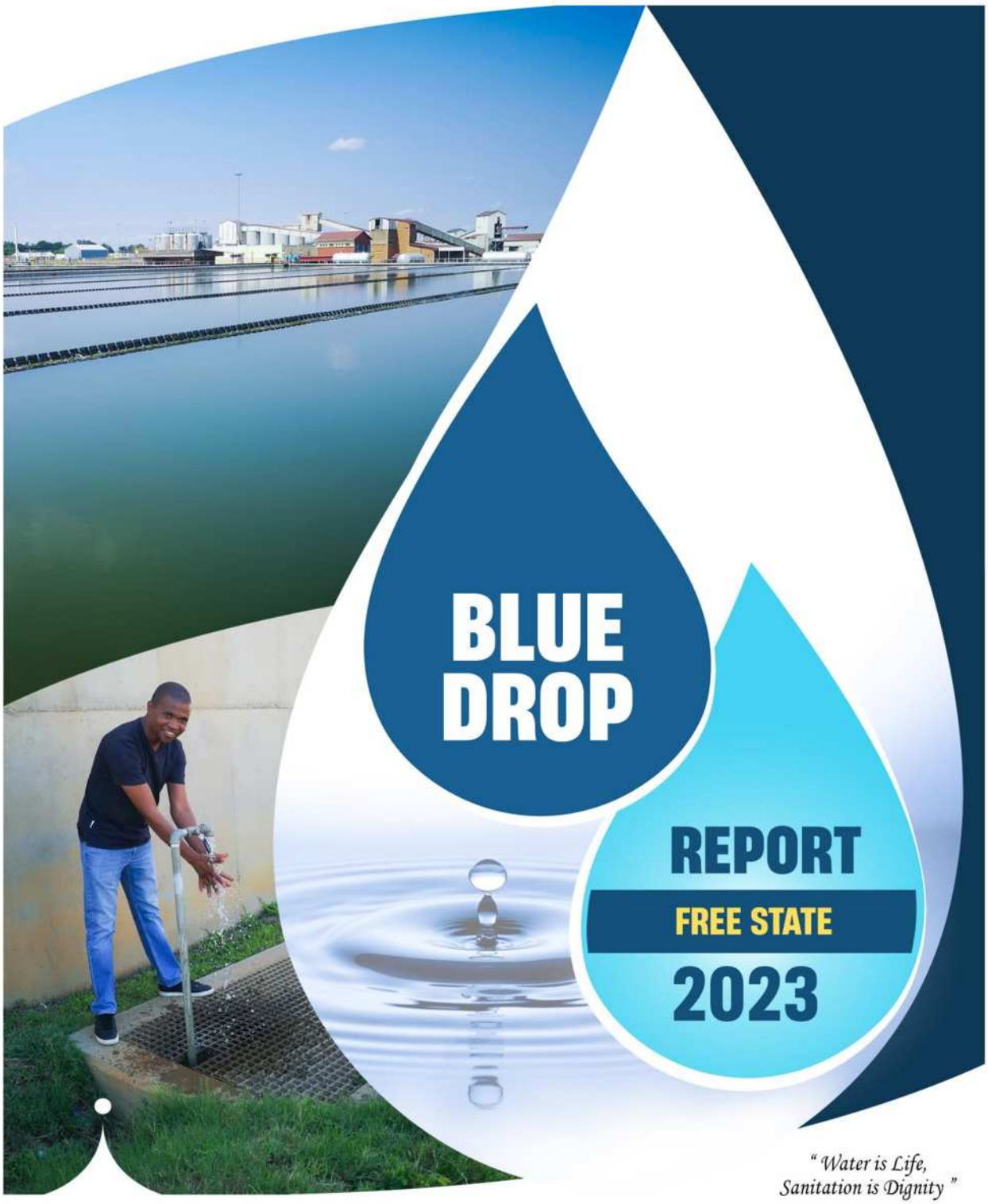


BLUE DROP

REPORT

FREE STATE

2023

"Water is Life, Sanitation is Dignity"

water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

2030 NDP

FOREWORD by the HONOURABLE MINISTER

I am pleased to present this 2023 Blue Drop report. I committed the Department to making this the flagship program for the sector, when we relaunched in 2021, and I am glad to report that we have achieved this outcome. We have once again achieved a 100% Blue Drop Audit coverage of Water Services Authorities across South Africa. It was encouraging to see the support from municipalities, water boards and other participants.

We remain committed to ensuring that water service authorities provide our people with access to safe drinking water and to safeguard against the real risk of waterborne diseases. However, there is a concerning decline in the performance of the drinking water systems, and not necessarily in the state of infrastructure, but in the water quality performance since the last report released in 2014 across the country. To arrest and to reverse the decline in municipal water and sanitation services, we must therefore strive for excellence and ensure that we have professionally managed, capable, efficient, and financially viable institutions.

The Blue Drop certification programme has been at the centre of much of the improvement over the years and has brought about change and reignited the passion and pride of our water sector specialists. At the same time, it embedded the culture of regulatory compliance. It sets the standard requirements and obligations for water services institutions and protects consumers from potentially unsustainable and unsafe services.

As part of this year's programme, we are once again strengthening our regulatory surveillance programme. Based on this together with the findings of the Green Drop Report we have developed an action plan to address issues in municipalities that have performed poorly. The plan covers 30 municipalities in 7 provinces that scored less than 10% in the Green Drop and or Blue Drop assessments. We are working collaboratively with the Department of Cooperative Governance and Traditional Affairs, the Municipal Infrastructure Agency (MISA) and the National Treasury to support work in these and other municipalities with poor Blue and Green Drop results. There are however limits to which national government support and intervention can address the decline in services. Municipalities, themselves, need to strengthen capacity, governance, and funding through the sale of water to ensure that these interventions have sustained outcomes. We have repeatedly seen services deteriorate rapidly after either technical or financial support ends.

We have also initiated legislative reforms towards strengthening the regulation of drinking water so that our institutions are efficient, financially viable and deliver services to the required standards. While that is the case, we also need a social compact with communities to ensure that water infrastructure is protected and that services are paid for. Together, we can not only slow the decline in services but start to reverse the trend.

The programme's historical success is also grounded in the water sector's support, and this year was no different. It was encouraging to see the support from municipalities, water boards, and other stakeholders who all heeded the call to action. I would like to express my sincere appreciation to all of them, including the researchers, service providers and sector partners, who have collectively taken ownership and made this an internationally recognised programme. We share in the success which forms the core of our endeavour to provide safe drinking water and sanitation.

We move forward knowing that we do not accept 'being good' as a norm in the South African water industry instead, we opt for excellence. The Blue Drop Certification programme has become more than just a subject field to its participants – it has become the accolade of water professionals, in and outside of this beautiful country. Let us continue being inspired by the results.

Minister for Water and Sanitation: Mr Senzo Mchunu

Date:

MESSAGE by the DIRECTOR-GENERAL

As a Department, we strive to make a positive impact on our country and its people as custodians of our water and sanitation resources. We undertook to being innovative and committed partners in our pursuit to ensure equitable and sustainable socio-economic development and universal access to water. The Blue, Green and No Drop Programmes have become embodiments of those principles.

This year's Blue Drop Audit cycle builds on the innovation from the previous cycle. Since inception, we have strived to make the reporting requirements seamless and simple for Water Services Institutions. This year we transitioned to an online Blue Drop scorecard, embedded within the IRIS system. IRIS is a truly world class online auditing and regulatory system and our WSIs continue to gain confidence in using it. We have further built on the "Very Rough Order of Measurement" (VROOM) model developed as part of the Blue Drop Technical Site Assessments. It provides insights on the state of the key elements of the water treatment infrastructure and provides an order of magnitude estimate of cost to return the infrastructure to a functional condition. It is this kind of valuable insight gained from the Blue Drop certification programme that can inform a coordinated response by DWS and other sector players.

Addressing the challenges in the water sector will require all hands-on deck and the Drop programmes has provided the impetus for that. We are now working collaboratively with the Department of Cooperative Governance and Traditional Affairs, MISA, and the National Treasury to implement an action plan to support 30 municipalities with poor Blue and Green Drop results.

We continue to build capacity and share knowledge through the audit process. The consultative auditing approach has received positive responses. Interaction with water treatment specialists has been beneficial to both municipalities and for that matter, our own internal team. As a department, we have continued to build internal regulatory capacity and a diverse pool of lead and assistant assessors. This bodes well for sustainability of the Drop programmes.

I would also like to express my appreciation to all the WSI leaders and their officials who participated in the process. It is only through our combined efforts that we can ensure provision of safe, reliable and affordable water services to our people.

Director-General for Water and Sanitation: Dr Sean Douglas Phillips

Date:

BLUE DROP REPORT 2023 INDEX

Swartland clarifiers in pristine condition

Greatness is not a function of circumstance. Greatness, it turns out, is largely a matter of conscious choice, and discipline. Jim Collins

Overstrand: Preekstoel WTW cascading inlet works

1. INTRODUCTION

The history of water will be measured not by its quantity but its quality...
Lucas van Vuuren
Institute for Water Quality Management, 1970's

Purpose and Intent of Blue Drop Certification

The Blue Drop certification programme seeks to identify and develop the core competencies required for the sector that, if strengthened, will gradually and sustainably improve the level of drinking water management in South Africa. It is a form of regulation that holds the intent to synergise the current goodwill exhibited by municipalities, business, Department of Public Works, as well as existing government support programmes to give the focus, commitment and planning needed to achieve excellence in drinking water management.

The Blue Drop audit is the tool whereby incentive- and risk-based regulation is conducted in South Africa. Regulation is important to ensure effective and efficient delivery of sustainable water services and has been commended by South African authorities and accoladed by international peers. A good regulation approach is characterised by its ability to clarify the requirements and obligations placed on water service institutions, thereby protecting consumers from a potentially unsustainable and unsafe service.

The Blue Drop process has been developed against the philosophy that if DWS as Regulator can inspire a path whereby disciplined people, disciplined thought, and disciplined action can be measured and reported, that the South African drinking water industry will be building greatness to last.

To achieve the South Africa we want will demand an extraordinary feat of human endeavour. The road ahead will be difficult. We will have to use our courage, wisdom and perseverance to achieve the South Africa we want. It will require an ambition that is rare.
President Ramaphosa

This report acknowledges those institutions with ambition that strives towards greatness ...and rewards those that achieve it.

Understanding Incentive-based Regulation in South Africa: Blue Drop Certification

Incentive-based regulation has gained significant momentum and support in the South African Water Sector, since its inception on 11 September 2008 (Minister of Water Affairs, National Municipal Indaba, Johannesburg). The concept was initially defined by two programmes: *Blue Drop Certification* for Drinking Water Quality Management Regulation; and *Green Drop Certification* for Wastewater Quality Management Regulation. This was expanded on with the third programme: ***No Drop Certification*** for water conservation and demand management in the water services sector.

The Blue Drop process measures and compares the results of the performance of water service institutions, and subsequently rewards (or penalises) the institution upon evidence of their excellence (or failures) according to the minimum standards or requirements that has been defined. Awareness of this performance is obtained by pressure via consumers, the media, politicians, business and NGOs. The strategy revolves around the identification of mediocre performing water service institutions who consequently correct the identified shortcomings, as well as the introduction of competitiveness amongst the water service institutions and using benchmarking in a market where competition is difficult to implement.

Each Blue Drop audit cycle is marked by incremental change in the audit criteria, guided by the status and priorities of the water services sector. It is therefore important for water service institutions to note that merely maintaining the previous cycle's Blue Drop evidence and performance will not warrant the same Blue Drop score.

Risk-based Regulation in South Africa: BDRR Profiles

The ***Blue Drop audit*** focuses on the entire value chain (abstraction, treatment, distribution) of the drinking water business within the water service institutions, whilst the ***Blue Drop Risk Rating (BDRR)*** assessment focuses on critical risk areas within water services provision.

The latter approach is a form of risk-based regulation which allows the water service institution to identify and prioritise the critical risk areas within its drinking water treatment process and to take corrective measures to abate these. Risk analysis is used by the Department of Water and Sanitation to identify, quantify, and manage the corresponding risks according to their potential impact on human health and to ensure a prioritised and targeted regulation of water service institutions with high-risk water supply systems.

The ***Blue Drop*** score reflects the status of the *whole water business* over a period of 12 months based on a comprehensive assessment of all Blue Drop performance areas, whereas the ***BDRR*** focuses on *specific risk indictors* at a specific moment in time (i.e. snapshot view), or over a more prolonged period in time (i.e., the Blue Drop 12-month period). The BDRR:

- Is a concise and focussed benchmarking exercise which extracts some of the key risk areas that would individually and collectively, give a snapshot view of the status of water quality
- Is an indicator of 'progress or digress' which can be run efficiently and accurately, annually or at any given time, without having to go through a comprehensive assessment process
- Enables the Water Services Authority to identify, quantify and manage the risks associated with drinking water services provision thereby empowering them to take relevant strategic management and operational decisions to support and improve sustainable water services provision.

The Department of Water and Sanitation integrates risk analysis as part of the audit process with the aim of quantifying, prioritising, and managing the risks to ensure targeted regulation of high-risk water service institutions. The Water Safety Plan (WaSP) is the tool whereby risks are identified and corrected.

Blue Drop Scores

The main outputs from the Blue Drop 2021-22 audit cycle are:

- A Blue Drop score for each water supply system assessed, which is aggregated into an overall municipal score, expressed as a percentage (%). The BD score will incorporate the performance of water services providers or bulk water providers (water boards), where such arrangements are in place
- A Blue Drop Risk Rating for each water supply system, expressed as a percentage (%)
- Technical Site Assessment score for selected water treatment works and water supply network inspected, expressed as a percentage (%)
- A singular VROOM cost for water treatment works that were inspected within each WSI, expressed in Rand (R).

Each indicator and its reference elements, can be described as follows:

- ***Blue Drop Score***: The Blue Drop IRIS scorecard is a web-enabled audit tool used to collect data and calculate the Blue Drop Scores. This data is collated into the Blue Drop Report outlining the WSIs performance against 5 Key Performance Areas for water supply systems assessed. A Blue Drop score (%) is awarded to an individual water supply system based on the results from the audit process which measures performance against 5 Key Performance Areas (KPA), plus a suite of bonuses and penalties. The individual audit scores aggregate as a single (weighted) institutional Blue Drop score. The score is weighted against the System Input Volume (SIV) towards the water supply system. This score serves as a Performance Indicator of the capacity, compliance, and good practice that the institution attains against the Blue Drop audit requirements, which again have been derived from national and international standards. A water supply system that achieves ≥95% Blue Drop score, is regarded as excellent. A system that achieved <31% is regarded as a dysfunctional system which would require appropriate interventions. [Note: The audit covers the abstraction, treatment, and distribution network to point of use].

  Institutions that achieve ≥95%, are Blue Drop Certified in acknowledgement of excellence

  The Blue Drop Scores for each water supply system is categorised as following:

	≥95-100%	Excellent situation, need to maintain via continued improvement
	≥80-<95%	Good performance, some room for improvement
	≥50-<80%	Average performance, ample room for improvement
	≥31-<50%	Very poor performance, need targeted intervention towards gradual sustainable improvement
	0-<31%	Critical state, need urgent intervention for all aspects of the water services business

- ***Blue Drop Certified***: A water supply system that achieves an overall ≥95% Blue Drop score and "Excellent" microbiological and chemical compliance, is thereby ''Blue Drop Certified".

- ***Blue Drop PAT:*** The Blue Drop Progress Assessment Tool (BDPAT) is a web-enabled assessment tool used to collect risk-associated data and calculate %BDRR. This data is collated into the Blue Drop Progress Report outlining the risk status of

water treatment works across South Africa. In order to streamline the process of conducting BDRR assessments, both now and in the future, the BDRR formular was incorporated into the IRIS system. This facilitated capturing of information directly from the IRIS with links to supporting data provided by the WSI for purposes of verification. The BDPAT on the IRIS system has the following functionality:

- ✓ Input value for each risk indictor with separate section for comments.
- ✓ Resource pack with supporting information for each WSI as submitted on IRIS.
- ✓ Some input values are transferred directly from IRIS into the BDPAT: population served, plant design capacity, plant classification, process controller and supervisor classification, water quality compliance and monitoring compliance results.
- ✓ Option to create and export results, per supply system or institution with a number of systems.

- ***Blue Drop Risk Rating:*** The updated BDRR formular has an added risk indicator, E: Water Safety Planning, to address the risk assessment requirements outlined in SANS 241. The updated BDRR formular is:

BDRR = (A x B) + C + D + E

Where the weighting factor is based on the following five risk indicators

- ✓ A - Design Capacity: Larger plants present a higher risk as they supply water to a larger population
- ✓ B - Operational Capacity: Plants operating above its installed capacity present a higher risk as its capability is compromised to deliver safe drinking water
- ✓ C - Water Quality Compliance: C1 Microbiological (70%) + C2 Chemical (30%)
- ✓ D - Technical Skills: Poor technical, management and maintenance skills base present a collective and individual high risk.
- ✓ E - Water Safety Plan: The absence of a WaSP, risk-defined monitoring programme based on full SANS 241 assessment and implementation of actions to reduce risk, would represent a high risk due to non-compliance with SANS 241 requirements and lack of risk-management procedures.

The proportional risk allocation between the components is 35: 35: 20: 10 for A/B: C: D: E.

Therefore full BDRR formular = **(35% (A*B)) + [35% C (70% C1 (Micro compliance X monitoring compliance) + 30% C2 (Chemical compliance x monitoring compliance)] + 20% D + 10% E.**

A ***BDRR value*** is calculated for each water supply system in South Africa, as provided in this Blue Drop Report. The BDRR profiles are usually sent to the respective Executive Mayors from the Minister's office, to inform the political principals of the facilities that reside in the high and critical risk space.

A ***BDRR %deviation*** is used throughout the Report and calculated using the following formular:

BDRR% deviation = BDRR / BDRRmax x 100

Where ***BDRRmax*** = Maximum BDRR of the water supply system

The ***BDRR %deviation*** is a calculated unit of measurement of risk which indicate the variance of a BDRR value before it reaches its maximum BDRR value. This unit of measurement allows the Department to compare all sized and types of water supply systems equally. All water supply systems are categorised according to their risk rating placing them in one of four categories as reflected below.

Low	Medium	High	Critical
<50%	50%<70%	70% - <90%	90% - 100%

Annexure A provides the history and alignment of the BDRR formular, the updated BDRR formular, and its application for multiple water supply systems.

- ***Technical Site Assessment Score***: A physical inspection is done at 1 to 2 sites to confirm the findings of the desktop audit. These sites are chosen based on their size, technology, and audit findings to best represent the potential state of the remainder of the delivery network, the treatment works and the initial part of the distribution system. The TSA score (%) reflects the physical condition of the raw water handling system (abstraction facility, pumps, and pipelines), the water treatment plant (inlet works to disinfection and sludge treatment), and distribution systems (command reservoir/s, water tower/s including pumpstations and bulk pipelines). The intention of the TSA is to verify the evidence presented and findings of the Blue Drop audit by undertaking a physical inspection of the selected site/s. Such inspections consider the:

  SCORING GUIDE (%)

  1.00 : Ideal performance and fully functional
  0.75 : Fully functional, but with minor corrections to be made
  0.50 : Partially functional and average performance
  0.25 : Partial performance with major corrections to be made
  0 : Failure and poor performance
  NA : In case of a unit process absent / not part of the plant design, assign NA = Not applicable

  - General aspects and the physical appearance of the plant terrain and buildings
  - Raw water handling pump stations, pipelines, inlet works and flow splitting
  - Chemical dosing and storage
  - Functionality and condition of the respective process units – flocculation, phase separation (clarification/settling, dissolved air flotation, sand filtration, membrane filtration, granular activated carbon), and disinfection
  - Functionality and condition of the high lift pumpstation, bulk pipelines from plant to command reservoir/s, command reservoir, and booster pumpstation
  - Sludge treatment and disposal.

  The scoring guide (%) depicted to the top right outlines the scoring criteria used for each TSA assessment element.

- ***VROOM costing:*** The Very Rough Order of Magnitude (VROOM) is an estimation of the funding required to restore existing infrastructure to its original design capacity and operations, by addressing civil, mechanical, and electrical defects. The cost is derived through an algorithm that uses the Blue Drop Inspector's impression of the condition of the hardware to a singular score for each water supply system inspected. **NOTE: The VROOM cost does not constitute a specification, schedule of quantities or a definite refurbishment figure, but rather an indicative amount to inform future budget and hardware requirements.**

Further terminologies that support the above concepts are as follows:

- ***WSI:*** A Water Services Institution is defined as "...an entity, utility, or authority that provides water services to consumers or to another water services institution, and thereby is subject to compliance with the water laws of South Africa. WSI also means a Water Services Authority, a Water Services Provider, a Water Board, and a Water Services Committee Entity..."

- ***WSA*:** A Water Services Authority is any District, Metropolitan or Local Municipality that is responsible for providing water services to end users.

- ***WaSP***: A Water Safety Plan is a plan to ensure the safety of drinking water through the use of a comprehensive risk assessment and risk management approach that encompasses all steps in water supply from catchment to consumer. Risk management processes to manage water supply systems effectively were introduced by the World Health Organisation (WHO) in 2004 and described as Water Safety Planning. More than 93 countries have adopted Water Safety Planning as a method for drinking water quality management with more than 70 countries having policies and regulations requiring Water Safety Plans. In South Africa, the WaSP is a requirement for Blue Drop Certification and is also a critical component of drinking water management and forms part of the BDRR calculation.

- ***WSP:*** A Water Services Provider is a public- or private entity that support or provide a service to a WSA. Such service may include operations and maintenance of the water network, treatment, and/or distribution system and depends on the agreement between the WSA and WSP. Waterboards are regarded as WSPs, also known as a Bulk Water Supplier or Provider, and their performance contributes to the overall municipal Blue Drop score. In several instances the WSAs themselves act as water service providers in their own areas and may also be WSPs for other WSAs.

- ***Water Delivery Network:*** This is where an independent Bulk Water Supplier and/or the WSA abstracts and delivers raw water (via pumps or gravity flow) from various water resources (dams, rivers, boreholes, springs) via pipeline/s to the water treatment works.

- ***Water Treatment Works:*** A water treatment facility that receives raw water at the inlet works and treats the raw water through a series of process units (flocculation, phase separation, and disinfection), stores and distributes the treated potable water for use by the populations it supplies water to. The treatment technologies available are categorised as conventional technologies, advanced technologies or other.

- ***Water Distribution Network:*** The distribution of treated potable water from command reservoir/s or tower/s via a network of pipelines to and within towns, cities, or water supply areas (industrial, commercial, and residential) for consumption or use.

- ***Water Use Efficiency:*** The national scale development and promotion of water conservation and water demand management aimed at the efficient use of the nation's limited water resources. The NWA, 36 of 1998, provides the legal framework for the effective and sustainable management of the country's water resources and it requires that the nation's water resources are used efficiently and equitably in a sustainable manner for the benefit of all South Africans. Section 22 states that a person who uses water, may not waste that water. Similarly, the objective of the Water Services Act, 108 of 1997 is to promote water conservation in the provision of water services and requires WSAs to outline measures to conserve water as a WSIs. The Act and its Regulations enables the implementation of Water Conservation and Water Demand Management (WC/WDM) for the municipal sector, by encouraging the sector to develop Bylaws, WC/WDM plans, WSDPs, etc. WUE is monitored as part of the Blue Drop and No Drop assessments. The international WUE benchmark is 180 l/p/d.

WUE (l/p/d) performance categories

Colour	WUE Range	Performance
	>300	Extremely high per capita water use
	>250-300	Poor per capita water use
	>200-250	Average per capita water use with potential for marked improvement
	>150-200	Good per capita water use but some improvement may be possible subject to economic benefits
	<150	Excellent per capita water use management

- ***IRIS***: The Integrated Regulatory Information System (IRIS) is a web-based application used by the Department of Water and Sanitation to facilitate the relationship between Regulation and Management of water supply and wastewater systems, while also keeping relevant stakeholders informed on compliance trends of registered supply systems. Information is uploaded by the Water Services Institution onto IRIS to allow the Inspector to assess evidence before, during and after the audit event. IRIS contains an inventory of information on all registered water supply systems, tracks historic system performance, and provides the platform to register water treatment works and operations staff.

- ***Diagnostic:*** A suite of key diagnostic themes in the Blue Drop report that cover a number of strategic areas of importance to the South African water industry. Diagnostics allows deeper examination of the data and a better understanding of the causes of behaviours and patterns, in answering pressing questions of "why did it happen? "and guide recommendations on "what corrections or interventions are needed?".

- ***DWQ:*** The drinking water quality is reported in accordance with the SANS 241:2015 drinking water quality standards and reflects the Institutional Water Quality Compliance (% Microbiological and % Chemical Qualities) for all the water supply systems assessed as part of the Blue Drop Audit. Systems with no monitoring information are marked with NI (No Information) and a zero compliance allocated.

- ***Chemical Compliance:*** The chemical acute health and chronic health quality is measured against the requirements of SANS 241:2015 and must comply as per the excellent requirements set by the Blue Drop Certification Programme. Acute health determinands pose an immediate unacceptable health risk if present at concentration values exceeding the numerical limits specified in SANS 241. Acute chronic determinands pose an unacceptable health risk if ingested over an extended period if present at concentration values exceeding the numerical limits specified in SANS 241 and is associated with population metrics.

CHEM Acute Health: Population <100,000		
Colour	Status	Percentage
	Excellent	≥97%
	Good	≥95 - <97%
	Unacceptable	<95%

CHEM Acute Health: Population >100,000		
Colour	Status	Percentage
	Excellent	≥99%
	Good	≥97 - <99%
	Unacceptable	<97%

CHEM Chronic Health: Population <100,000		
Colour	Status	Percentage
	Excellent	≥95%
	Good	≥93 - <95%
	Unacceptable	<93%

CHEM Chronic Health: Population >100,000		
Colour	Status	Percentage
	Excellent	≥97%
	Good	≥95 - <97%
	Unacceptable	<95%

- ***Microbiological compliance:*** The acute health microbiological quality is measured against the requirements of SANS 241:2015 and is associated with population metrics. Acute health microbiological determinands pose an immediate unacceptable health risk if present at counts or values exceeding the numerical limits specified in SANS 241. Therefore, the WSI has a regulatory obligation to ensure that quality of water supplied to consumers meet requirements as prescribed by SANS 241.

MICRO: Population <100,000		
Colour	Status	Percentage
	Excellent	≥97%
	Good	≥96 - <97%
	Unacceptable	<96%

MICRO: Population >100,000		
Colour	Status	Percentage
	Excellent	≥99%
	Good	≥98 - <99%
	Unacceptable	<98%

- ***Regulations 2834 and 3630:*** The Blue Drop KPA 1 considered compliance of supervisory, process control and maintenance staff against Regulation 2834 and draft Regulation 813. These regulations have now been formally promulgated as Regulation 3630, in the Government Gazette No. 48865 of 30 June 2023. These regulations are called the Regulations relating to Compulsory National Standards for Process Controller and Water Services Works. Reg. 3630 will be implemented in phases over a period of 18 months, whereafter the sector will have 6 months to update their details on IRIS to be aligned with R3630:

  - Phase 1 - Comparison study by DWS on the impact of the R3630 on the IRIS profiles and amendment of application/ registration/ classification forms
  - Phase 2 - Sector provincial workshops to communicate the content of the R3630, the findings of the impact study, and how it will affect the IRIS profiles of Water Care Works and Process Controllers
  - Phase 3 - Implementation of the R3630 on IRIS
  - Phase 4 - Monitoring of compliance (2 years after promulgation).

Note: R3630 will not have an impact on the Blue Drop 2023 scores. Any queries may be directed via e-mail to Mr Lodevikus Nel at nell@dws.gov.za and the IRIS Helpdesk at niemandm@dws.gov.za and mashigoi@dws.gov.za.

Blue Drop Reporting

This 2023 Blue Drop Report upholds the Minister's commitment to provide the water sector and its stakeholders with **ongoing, current, accurate, verified,** and **relevant** information on the status of water services in South Africa. It follows on a series of Blue Drop Reports from 2009 to 2022, by providing feedback and progress pertaining to the current status of municipal, water boards (bulk suppliers), and DFFE water supply systems and water treatment works.

The 2023 Blue Drop Report provides information on three different levels:

1. ***System specific*** data and information pertaining to the performance of each drinking water supply system at WSI level
2. ***Province specific*** data and information that highlight the strengths, weaknesses, and historic trends for the respective WSIs within a Province
3. ***National overview*** that collates the findings from a provincial level to give an aggregated national perspective of water service performance. Historic trends are provided to gain insight into the success of provincial and national strategies to improve water management and to inform future strategies and interventions.

> ***The final proof of greatness lies in being able to endure criticism without resentment.***
>
> *Elbert Hubbard*

Saldanha Bay: Withoogte filter gallery – excellent operation and maintenance

JB Marks: Settling tanks in immaculate condition, cleared of solids, delivering SANS241 compliant water

2. BLUE DROP STANDARDS 2022

The Stockdale paradox:
Confront the brutal truth of the situation, yet at the same time, never give up hope

Blue Drop Audit Process and Procedure

Blue Drop Audits were conducted by 26 audit panels comprising of 2-3 qualified water professionals. Inspectors qualified after achieving a threshold examination score. Annexure B provides a flow chart of the Blue Drop 2021-22 Audit Process and Procedure leading into the publication of Blue Drop 2023 results. WSIs were supported and capacitated through the audit process, as part of the Department's commitment to a 'consultative audit process'. Provincial symposia, attended by WSIs from that province, were held prior to the audit to share information on the audit process and criteria. Information was also shared on the role of IRIS and introduction to the IRIS Helpdesk. WSIs were also notified in advance of the audit date, audit criteria and the required portfolio of evidence (PoE) for the audit to assist with their preparation.

The IRIS Audit Scorecard was designed to consider evidence against 5 Key Performance Areas (KPAs):

1. Capacity Management
2. Drinking Water Quality Risk Management
3. Financial Management
4. Technical Management
5. Drinking Water Quality Compliance.

Each KPA and sub-criteria carry a different weighting based on the regulatory priorities. The Blue Drop KPAs, weights, and audit requirements (standards) are summarised in the section below. Each KPA and sub-criteria carry a different weighting and are based on the relative regulatory priorities. Annexure C provides guidance on the format and interpretation of the Report Card.

Blue Drop Audit Period: 1 July 2021 – 30 June 2022

Blue Drop Audit Requirements (Standards)

KPAs and Sub-KPA	Sub-weight	Blue Drop Requirement
KPA 1: CAPACITY MANAGEMENT (15%)		
1.a) Registration of Water Treatment Plant	20%	The water treatment facility is registered as per the requirements of Regulation 2834 or as per Blue Drop Standard (Draft Regulation 813)
1.b) Registration of Process Controllers and Supervisor	20%	Process controllers and Supervisors are classified as per Regulation 2834 or Draft Regulation 813. This Requirements will apply for all shifts of a specific WTW. i) Classification certificates of all process controllers and supervisors/superintendents must be available in the IRIS. ii) Compliance with Regulation 2834 coupled with shift details; WSI must indicate shift patterns or measures in place when a shift does not comply with Regulatory Process Control requirements. iii) WSI must indicate process controllers and/or supervisors that are 'shared' across different plants/sites.
1.c) Maintenance Capacity	20%	The Water Treatment and Network must be served by a competent maintenance team (internal or outsourced), executing the maintenance work according to an acceptable maintenance plan/schedule. Evidence of the Maintenance Team as determined by technology used for general maintenance work at the relevant WTWs & distribution network - mechanical, civil and electrical - (Internal or evidence of Outsourced): i) Term Contract (Outsourced) or Organisational Structure (Internal) ii) Proof of team competency (Qualification & Experience & Trade-test) iii) Provide a site specific operation and maintenance schedule) iv) Logbook with maintenance entries as per maintenance plan.
1.d) Engineering Management Capacity	20%	The WSI must ensure that a competent engineering specialist oversee water treatment and supply operations, maintenance, and general asset management. Number of Engineering Staff available in the WSI taking responsibility for Maintenance Planning and General Asset Management: i) 1 X Engineering Technician, ii) 1 X Engineering Technologist iii) 1 X Engineer, or iv) MISA Appointee: temporary engineering staff

KPAs and Sub-KPA	Sub-weight	Blue Drop Requirement
1.e) Scientific Capacity	20%	The WSI must ensure that a suitably qualified professional scientist oversee the implementation of the Operational and Compliance monitoring programme (sampling and analyses) Number of Scientific Staff appointed for the management of drinking water quality management, incl. implementation of the water safety planning process, and monitoring programme, sampling, and analyses: i) 1 X Candidate Scientist ii) 1 X Professional Scientist
KPA 2: DRINKING WATER QUALITY RISK MANAGEMENT (20%)		
2.a) Water Safety Planning	40%	The WSI must provide a drinking water risk management plan, which adheres to an internationally recognised standard/best practice such as the WHO/IWA water safety plan framework: (i)Team Assembled, (ii) System detailed in the Plan, (iii) Plan was reviewed in past 3 years. (iv) Detailing System-specific Hazard/Risk Assessment, & (v) Adequate Control measures identified. *Comment to Inspector: use the following points as findings in comments -* *i) signature from Technical director/MM* *ii) Risk prioritisation method* *iii) Risk assessment of catchment* *iv) Risk assessment of plant* *v) Risk Assessment of network* *vi) Final risk rating* *vii) Mitigating measures for all high and medium risks* *viii) Full SANS 241 analysis of raw and final water* *ix) Identification of risk determinands* *x) additional risk determinands to monthly compliance monitoring as per SANS 241 -frequency based on category of risk (acute/chronic/aesthetic)* *xi) proof that >25% of mitigating measures have been implemented – proof in form of purchase order, pictures, water quality results, tender document, etc.*
2.b) Operational Monitoring	10%	Each WTW will have an operational monitoring programme in place which informs the operational treatment efficacy (as per the required frequency) of the treatment facility as per the SANS 241. Details of Operational Monitoring: i) Proof of Operational Monitoring sites, determinands and frequency ii) Samples must include: i) inflow (raw), (ii) pre-filtration, iii) post filtration; (between each unit process clarification, filtration) vi) final iii) Determinands monitored; must at least incl. pH, Turbidity, Free Chlorine (Final) iv) As per Authorisation measure / daily abstraction rates (kl/d)
2.c) Compliance Monitoring	20%	Each Water Supply System will have a compliance monitoring programme in place (implemented), informed by the Water Safety Planning process, and SANS 241 requirements, as per the required frequency, determinands and sampling points. Details of Compliance Monitoring Programme: i) Compliance Monitoring informed by water safety planning process, inclusion of identified risk determinants (WSI to provide list of problem determinants, sample points and frequency of monitoring) ii) Required sites monitored: WTW final & distribution network (monitoring programme covering 80% of the supply system) + Frequency of analyses: Final: Weekly for acute health (micro, chemical), Monthly: final and distribution network for all other risk determinants as per SANS 241.
2.d) Laboratory Credibility	20%	All compliance monitoring samples must be analysed at a credible laboratory (either accredited according to SANAS requirements or participating in a Proficiency Testing scheme with acceptable z-scores) for the required determinands, with an acceptable turnaround time. i) Certified Data > 80% = 40% ii.a) SANAS Certificate of Accreditation Methods or Z-scores results (z-scores must be > –2 & < +2 are acceptable) in a recognised Proficiency Testing Scheme = 60%; OR ii.b) Proof of intra- and Inter-laboratory proficiency (quality assurance as prescribed in Standard Methods) = 40%
2.e) Incident Management Protocol	10%	As part of the DWQ Risk Management preparedness the WSI should have an Incident Management Protocol in place and an Incident Register detailing incidents, causes, rectification, and timeframes. The Treatment works will have a WTW Logbook to record all treatment process related incidents. (Feedback to WaSP update!!) i) WSI must have an Incident Management Protocol to guide reaction should there be a failure in DWQ: alert levels, response times, required actions, roles and responsibilities, communication vehicles. ii) A DWQ Incident Register detailing 1) details of Incidents (date, locations, description) 2) Causative factors, 3) Rectification (actions taken) & 4) Timeframes (date of resolution) iii) A WTW Logbook detailing all treatment process related incidents.
KPA 3: FINANCIAL MANAGEMENT: 15%		
Water Treatment Operations and Maintenance Cost Determination done: i) Determined for the whole Water Supply System; or ii) Determined for part of the system; or iii) Not system specific (Global only); or iv) Not Done at all		

KPAs and Sub-KPA	Sub-weight	Blue Drop Requirement
3.a) Water Supply Operations Cost Determination	35%	The WSI must determine the actual operations and maintenance cost of water treatment and supply (reticulation) per water supply scheme and express this in R/m3. (This determination should include energy use for treatment and pumping) *Note: This will exclude capital cost for upgrades rehabilitation. i) Municipality / WSI must provide evidence of a proper O&M cost determination for the entire water supply system (treatment works, network, pumpstations) This must at least Incl: a) Energy Consumption b) Raw Water Cost c) Compensation of Employees d) Chemical cost e) Maintenance Cost ii) Provide an operational cost determination per m^3 treated. *Note: This will exclude capital cost for upgrades rehabilitation.*
3.b) Water Supply Operations & Maintenance Budget	10%	The WSI must have an annual O&M budget per water supply system, for water treatment and supply / reticulation. The WSI must provide proof of the water supply system Operations & Maintenance Budget per annum (for the audit period) -Including the water treatment works, bulk distribution and reticulation.
3.c) Water Supply Operations & Maintenance Expenditure	25%	WSI must provide evidence of the water treatment and supply O&M expenditure per annum (to be measured in relation to the original budget). O&M Expenditure Within Approved FY budget (88% <> 100%) O&M Expenditure That Overspent (>100%) Against Approved Budget O&M Expenditure That Underspent (<88%) Against Approved Budget No proof = 0%
3.d) Supply Chain Management of Services and Treatment Products	20%	There must be appropriate supply chain management process in place to ensure continuous availability of treatment chemicals (and related consumables), maintenance and spares. WSI must provide proof of approved contract for outsourced services that cover the BD audit year: i) technical services (i.e. maintenance, spares, calibration) and ii) supply of chemical, and treatment consumables. (Where applicable)
3.e) Capital Budget and Expenditure	10%	The WSI must provide current (and planned) capital budget (current FY and future) and expenditure for refurbishment and/or upgrades of the specific water treatment and supply system. In terms of Refurbishment or Upgrades, the WSI must provide: i) Capital budget for both WTW and network ii) Expenditure for both WTW and network No Proof
KPA 4: TECHNICAL MANAGEMENT (15%)		
4.a) WTW Design and Supply Capacity Management	20%	The WSI must be authorised for a Section 21(a) water use, measure operations (volumes treated per day) accordingly and record for planning and audit purposes. It is also required to have record of the available supply/pumping capacity to convey water to reservoir(s). The WSI must provide: i) Documented design capacity of the water treatment facility ii) Documented daily water treatment volumes (over 12 months of assessed period) in kl/d. iii) WSI is required to provide motivation/proof of accuracy of meter readings (calibration or verification)
4.b) Process Audit	30%	A water treatment facility must be subjected to an annual condition assessment and/or a Process Audit (conducted by a duly qualified professional person) to inform functionality of the infrastructure. Risk findings must be incorporated in the Water Safety Planning process. i-a) Condition Assessment report (conducted by a qualified engineering/technical/scientific internal resource). Evidence required of audit findings and recommendations on treatment facility status (Jul '19 - to Sep '22); **OR** i-b) Process Audit report (conducted by a duly qualified independent professional person) to include the (design) capability of the plant to meet compliance standards, as well as actual performance of unit processes (Period: Jul '15 to Sep '22). ii) Evidence/plan of implementation of a-1 or a-2 audit recommendations during year(s) following Audit Report *Note: Cross-check if findings (risks) and recommendations (corrective measures) have been incorporated in Water Safety Plan (WaSP)* 5% will be deducted if findings not incorporated in the WaSP or Risk Register under crit. (KPA 2a)
4.c) Water Reticulation Inspection	25%	The WSI shall ensure that the water supply system is subjected to at least an annual inspection to determine asset condition of pump-stations, reservoirs, and the network in general. The results of this inspection must inform the water safety planning process, especially the reservoirs. Provide evidence in form of capacity and condition assessment/audit description, findings, and recommendations of system. Report to include a water flow balance that provides an indication of Non-Revenue Water. *Note: Cross-check if findings (risks) and recommendations (corrective measures) of Reticulation Inspection Report have been incorporated in WaSP.* ***NB! Must report on condition of reservoirs.***
4.d) Water Treatment and Supply system Asset Management	25%	Water Infrastructure must be included in an updated WSI Asset Register (as per AGSA requirements), detailing: i) Proof of Asset Register, evidence to be submitted. ii) Asset register to include movable equipment & immovable infrastructure / assets with matching detail. The asset register must detail:

KPAs and Sub-KPA	Sub-weight	Blue Drop Requirement
		a) relevant equipment and infrastructure b) asset description c) location d) condition e) remaining useful life f) replacement value iii). Proof that Asset Register is used to inform Maintenance Plan.
KPA 5: DRINKING WATER QUALITY COMPLIANCE (35%)		
5a) Monitoring Data Submission to DWS	10%	A WSI must ensure that all Compliance Monitoring data is submitted on a monthly basis to the Department of Water and Sanitation on the required Regulatory System (IRIS). (12 months). Compliance monitoring is adhering to the water safety planning informed monitoring programme. The WSI should ensure that all DWQ data (compliance incl. risk-based) is submitted to DWS: i) Data submitted for 12 months of the audit period ii) All sampling results submitted as per the WaSP monitoring programme
5b) Acute Health Microbiological Risk Compliance	30%	The **Acute Health Microbiological Quality** of water supply must comply with the South African National Standard (SANS241) as per the Excellent Requirements set by the Blue Drop Programme.
	10%	**Acute Health Microbiological Monitoring Compliance** (% as per IRIS)
5c) Chemical Compliance	20%	The **Chemical Quality** of water supply must comply with the South African National Standard (SANS241) for both Acute and Chronic health determinands, as per the Excellent Requirements set by the Blue Drop Programme. i) Chemical - Acute Health: - Excellent Comp. (97% for <100 000) & (99% for >100 000) - Good Compliance (95% for <100 000) & (97% for >100 000) ii) Chemical - Chronic Health: -Excellent Compliance (95% for <100 000) & (97% for 100 000) -Good Compliance (93% for <100 000) & (95% for 100 000)
	10%	**Chemical Monitoring Compliance** (% as per IRIS)
5d) Risk Defined Compliance	15%	The Compliance of all **Determinands identified** during the **Risk Assessment Process** to be included in the risk-defined monitoring programme, must comply with the requirements set in the SANS 241. i) Excellent Compliance (95% for <100 000 & 97% for >100 000) ii) Good Compliance (93% for <100 000 & 95% for >100 000)
5e) Treatment (Operational) Efficiency Index	5%	The compliance of **operational determinands** as monitored at the Final Water sampling point must comply with the SANS 241 Requirements. This is the Works operational determinands compliance and should be calculated manually. **Note**: this is not compliance data that has an operational risk. i) Excellent Compliance (93% for <100 000 & 95% for >100 000) ii) Good Compliance (90% for <100 000 & 93% for >100 000)
BONUSSES		
6a) Process Control Training	25%	i) Process controllers and supervisory staff must be subjected to relevant training over the past 24 months as from the date of audit. ii) Cross-pollination and in-house training will be acknowledged as non-accredited capacity building.
6b) Performance Agreements	25%	Workplans or Performance Agreements of process controllers and DWQ Management aligned to Water Treatment Operations Requirements and SANS 241 compliance targets.
6c) Publication of Drinking Water Quality Results	25%	The WSI takes responsibility to inform the public of quality of drinking water supplied.
6d) Water Demand Management	25%	WSI has a water balance of its water supply system in terms of Regulation 10 under Section 9 of the Water Services Act.
PENALTIES		
7a) Data variances and Discrepancies	50%	The penalty shall be applied if a selected sample of hardcopy records present differences to what was uploaded onto IRIS or reported to the public.
7.b) Non-notification of DWQ Failure	50%	Should the WSI fail to present evidence of an Adverse Water Quality Alert Notice (incl. Boil Water Notice) issued for significant (sustained) failures.

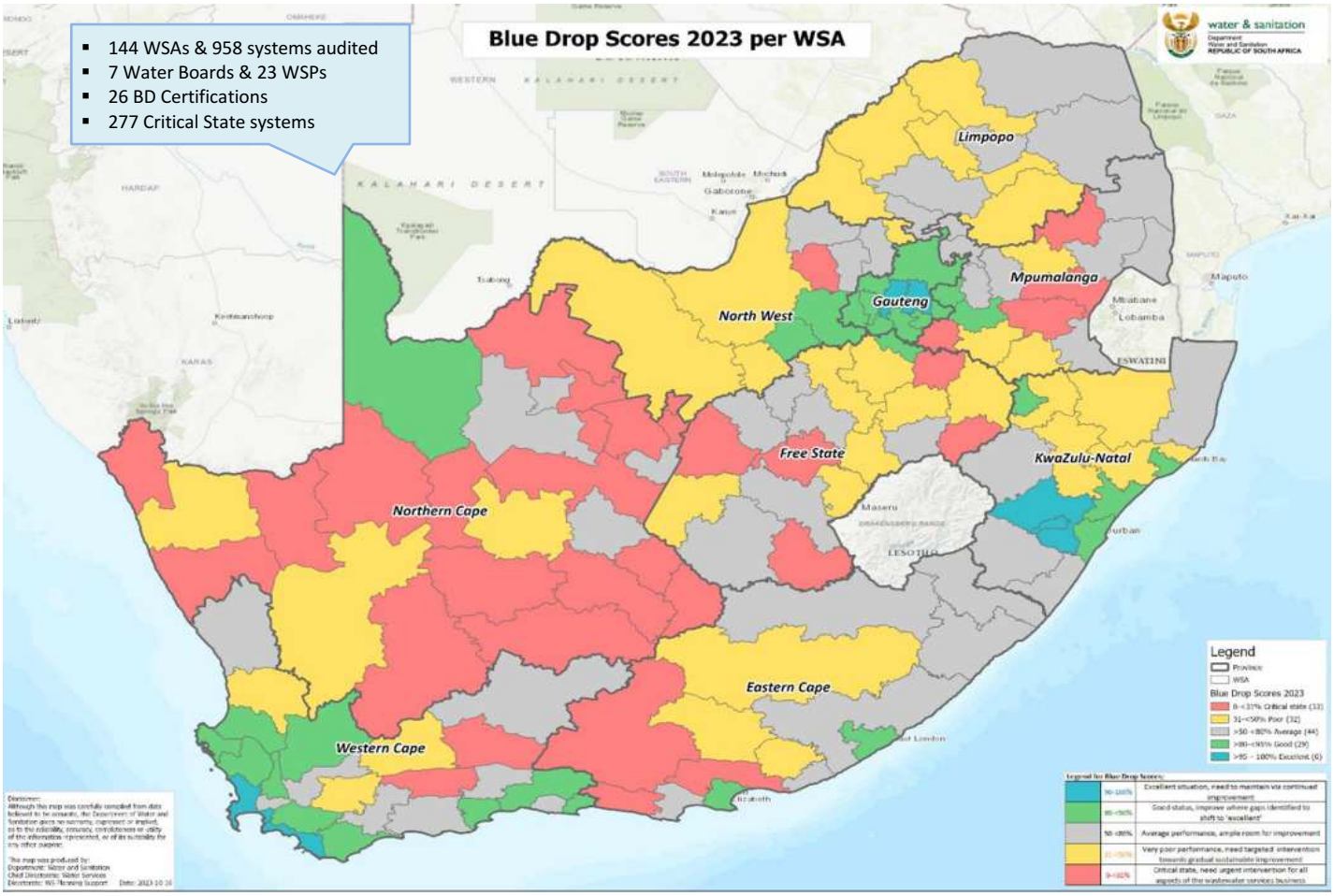
"If you are going to achieve excellence in big things, you develop the habit in little matters. Excellence is not an exception; it is a prevailing attitude."

Colin Powell

Impedile Town: View from top of reservoir 2, good structural integrity

Mbombela/Umjindi: WRCW WTW raw water meter read daily, calibrated

3. NATIONAL PERFORMANCE OVERVIEW OF MUNICIPAL WATER MANAGEMENT



National Blue Drop Report 2023

The National Blue Drop Report 2023 is available from the Department of Water and Sanitation homepage. It can be accessed via www.dow.gov.za that will route the user to https://ws.dws.gov.za/IRIS/LatestResults.aspx

The Free Sate Blue Drop Report 2023 is a sub-set of the national report and provides a provincial perspective with detailed results and findings of each WSA.

The national report also contains conclusions, recommendations, and way forward for the country and for provinces/regions as a collective.

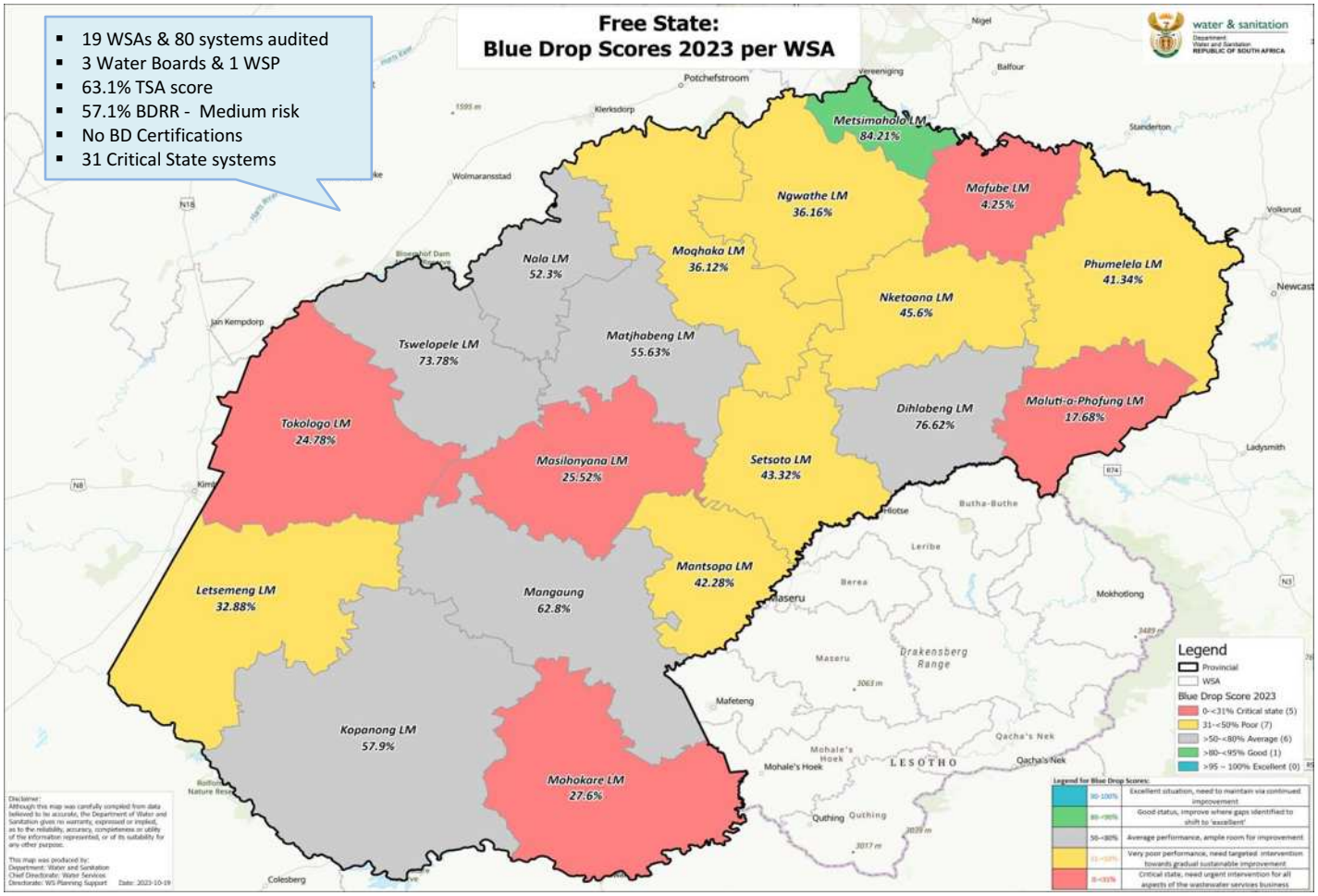
We will use this report as the baseline for the Water Services Improvement Programme (10-point plan) from where we will measure the sustainable turn-around which we aspire to. We move forward knowing that we do not accept 'being good' as the norm for the South African water and wastewater industry instead, we endeavour towards excellence.

Minister for Water and Sanitation: Mr Senzo Mchunu

Piketberg reservoir secured with routine inspection regime

Impala reservoir secured, sign posted, neat terrain

4. FREE STATE PROVINCE: MUNICIPAL WATER MANAGEMENT PERFORMANCE



Provincial Synopsis

The Free State province provides drinking water to a total population of 3,028,741 persons in South Africa.

An audit attendance record of 100% of the 19 WSAs with 80 water supply systems across the province, 3 Water Boards (Bloem Water, Rand Water and Sedibeng Water) and MaP Water affirms the province's commitment to the Blue Drop national incentive-based regulatory programme. Bloem Water has taken over the Sedibeng Water supply systems and water treatment systems in the Free State and Northern Cape. It must be noted that Sedibeng Water was still in operation during the blue drop audit period and Bloem Water was not responsible for the respective systems over the audit period. Bloem Water has recently undergone a name change to Vaal Central Water (Government Gazette no. 48954 dated 13 July 2023). The main Bulk Water Supplier is Bloem Water who supplies potable water to 14 water supply systems in Mangaung MM and Kopanong LM and is followed by Sedibeng Water who supplies potable water to 7 water supply systems in Matjhabeng LM and Nala LM, and Rand Water who supplies potable water to 2 water supply systems in Metsimaholo LM and Ngwathe LM.

The Regulator determined that no water supply system scored more than 95% when measured against the Blue Drop standards and thus did not qualify for the prestigious BD Certification. In 2014, 6 water supply systems were awarded Blue Drop status. Using the 2014 audit results as comparative baseline, the province shows a decline in excellence for 2023.

Only three (3) of 19 WSAs improved on their 2014 scores, namely Dihlabeng LM, Setsoto LM and Tswelopele LM. The remaining 16 WSAs regressed to lower Blue Drop scores compared to their 2014 baselines. The Metsimaholo LM (84.2%), Dihlabeng LM (76.6%) and Tswelopele LM (73.8%) are the best performing WSAs in the province. The Blue Drop scores of these top WSA performers were supported by technical site assessment scores of 82% for the Hoopstad WTW in Tswelopele LM, 68% for the Clarens and Fouriesburg WTWs in Dihlabeng LM, followed by the Deneysville WTW in Metsimaholo LM with a TSA score of 73%. 31 water supply systems were identified to be in a critical state in the province compared with 5 water supply systems in 2014.

The province's overall Blue Drop performance is characterised by particular strengths in none of the KPAs provincial averages <50% (KPAs 2 to 5) and 53.3% (KPA 1), with the exception of only 2 water supply systems that performed well with BD scores >80%, confirming that the risk management practices are not well embedded in the water supply business. The KPAs that require attention and are reflecting scores below 50% are KPA 2 DWQ Risk Management (37.6%), KPA 3 Financial Management (49.3%), KPA 4 Technical Management (28.1%) and KPA 5 Drinking Water Quality Compliance (39.5%). The provincial Blue Drop Risk Rating (BDRR) remained in the average risk category but improved slightly from 61.9% in 2022 (BD PAT) to 57.1% in 2023. 34 (of 80) water supply systems are situated in the low risk category, 22 WSSs in the medium risk category, 13 WSSs in the high risk category, and 11 WSSs in the critical risk category.

The Regulator is optimistic that the BD 2023 report provides an updated residual basis from where a positive trajectory for water services delivery and improved performance will follow in the next BD audit. Municipalities and their service providers are encouraged to start preparation for the next Blue Drop audit cycle, which is planned to cover the financial year 2023/24 and released in 2025. The 2023 Blue Drop status for WSAs in the province are summarised in the table below.

Table 1 - 2023 Blue Drop Summary

WSA Name	2014 BD Score (%)	2023 BD Score (%)	2023 BD Certified ≥95%	2023 Critical State (<31%)
Dihlabeng LM	61.6%	76.6%↑	None	None
Kopanong LM	67.3%	57.9%↓	None	None
Letsemeng LM	62.6%	32.9%↓	None	None
Mafube LM	28.8%	4.3%↓	None	Frankfort, Tweeling, Villiers
Maluti-a-Phofung LM	97.7%	17.7%↓	None	Bluegumbosch, Kestell, Harankopane, Mphatlalatsane, Greater Qwaqwa, Makwane, Harrismith, Tshiame
Mangaung	77.5%	62.8%↓	None	Soutpan Krugersdrift Dam
Mantsopa LM	52.8%	42.3%↓	None	Hobhouse, Tweespruit
Masilonyana LM	29.6%	25.5%↓	None	Brandfort, Theunissen, Verkeerdevlei, Winburg
Matjhabeng LM	93.6%	55.6%↓	None	None
Metsimaholo LM	84.5%	84.2%↓	None	None
Mohokare LM	65.3%	27.6%↓	None	Rouxville, Smithfield, Zastron
Moqhaka LM	60.2%	36.1%↓	None	Steynsrus
Nala LM	81.3%	52.3%↓	None	None
Ngwathe LM	55.4%	36.2%↓	None	Parys, Vredefort, Koppies, Edenville boreholes
Nketoana LM	71.4%	45.6%↓	None	None
Phumelela LM	61.3%	41.3%↓	None	None
Setsoto LM	42.2%	43.3%↑	None	Clocolan, Senekal
Tokologo LM	56.8%	24.8%↓	None	Boshof, Dealesville
Tswelopele LM	70.1%	73.8%↑	None	None
Totals	-	-	0	31

The Department of Water and Sanitation acknowledges the excellence in water services management achieved for the Blue Drop Audit year of 2021-22. No Blue Drop Certificates are awarded in the Free State Province.

Background to Water Delivery and Distribution Infrastructure

The total volume of water treated in the province is 788,990 kl/d. Nineteen (19) WSAs, 3 WBs (Bloem Water, Rand Water and Sedibeng Water) and MaP Water are responsible for water services through a water network comprising of:

- 75 WTWs, boreholes and dams with the bulk of the water treated and supplied by the Mangaung MM (Bloem Water) and Matjhabeng LM WTWs with a total Average Daily Production of 238,530 kl/d and 292,000 kl/d respectively
- 23 (of 80) WSSs in 6 WSAs are provided with bulk potable water from Bloem Water, Rand Water and Sedibeng Water
- 228 pump stations, 1,480 km bulk water supply lines (10 of 19 WSAs), 6,172 km reticulation pipe lines (8 of 19 WSAs), and 335 reservoirs/ towers.

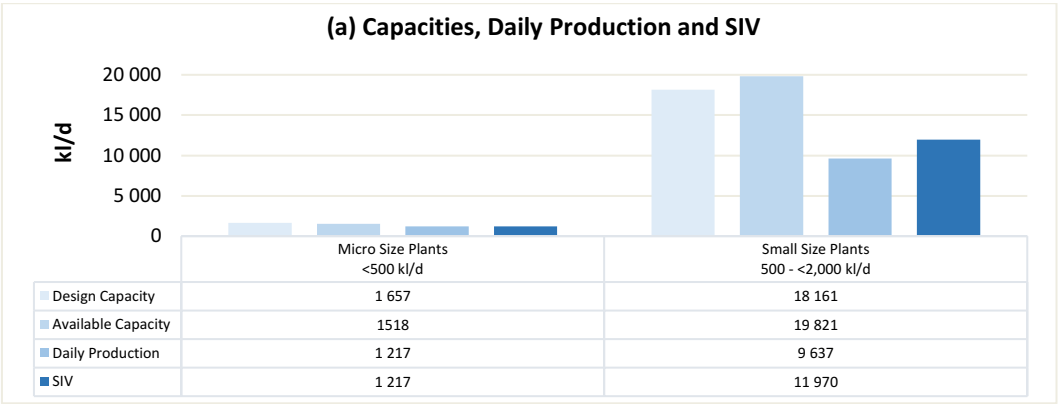
Table 2 - Summary of Capacities, Daily Production and SIV distribution according to plant sizes

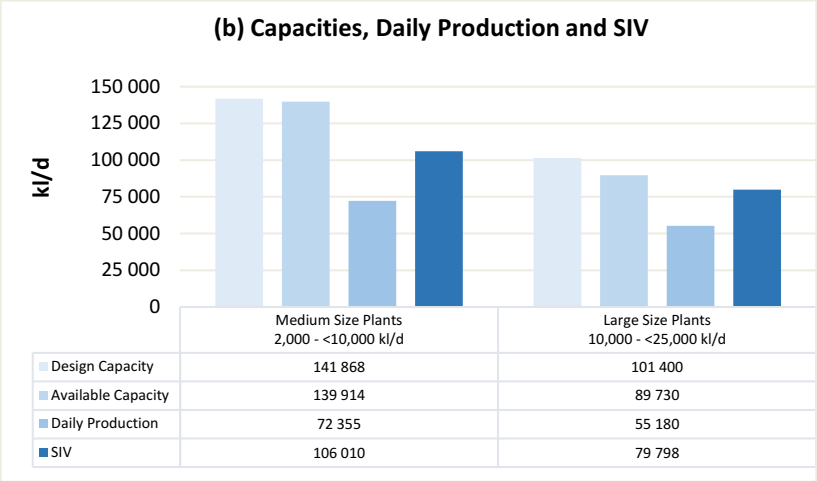
	Micro Size Plants	Small Size Plants	Medium Size Plants	Large Size Plants	Macro Size Plants	Unknown (NI)*	Total
	<500 kl/day	500 - <2,000 kl/day	2,000 - <10,000 kl/day	10,000 - <25,000 kl/day	≥25,000 kl/day		
No. of WTWs, Boreholes, Springs	5 (7%)	18 (24%)	34 (45%)	8 (11%)	10 (13%)		75
Total Design Capacity (kl/day)	1,657	18,161	141,868	101,400	1,055,000	None	1,318,086
Total Available Capacity (kl/day)	1,518	19,821	139,914	89,730	1,021,325	None	1,272,308
Average Daily Treatment Volume (kl/day)	1,217	9,637	72,355	55,180	650,601	12 NI	788,990
Total SIV (kl/day)	1,217	11,970	106,010	79,798	592,648		791,643
Design Capacity Utilisation (%)	73%	53%	51%	54%	62%		60%
Available Capacity Utilisation (%)	80%	49%	52%	61%	64%		62%

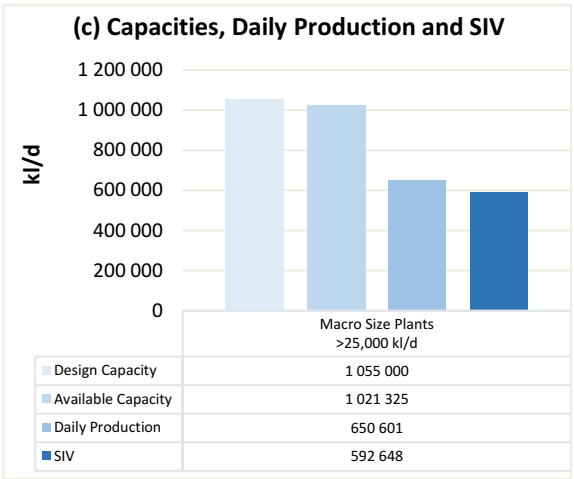
** "Unknown" means the number of WTWs with NI (No Information) on design capacity or available capacity or SIV*

The audit verified a total installed design capacity of 1,318,086 kl/d and a total available capacity of 1,272,308 kl/d with most of this capacity residing in the macro-sized water treatment plants.

Collectively, the 75 WTWs produce 788,990 kl/d and distributes 791,643 kl/d across the water networks. By comparing the available treatment capacity with the treated water volume, a spare treatment capacity of 483,318 kl/d is available (38%) to meet additional future demands. However, the WUE for the province is high (ave. 261 l/p/d) compared to the international WUE benchmark of 180 l/p/d, indicating a high ratio between effective water use and actual water abstraction. Going forward, the province will have to dedicate significant resources to curb water losses and NRW.







Light blue to dark blue represents from left to right design capacity, available capacity, daily production and SIV

Figure 1 - Capacities, Daily Production and SIV Distribution - (a) micro to medium sized WTWs, (b) large WTWs, and (c) macro sized WTWs

In some cases, a Bulk Water Supplier provides water across provincial borders, and it is difficult to report accurately on design capacity and available capacity at provincial level, as the statistical data may become repetitive. Therefore, the reporting on the total system input volumes (SIV) would provide more accurate figures on the supply of treated water to the various water supply systems. The total SIV in the province is 791,643 kl/d and the average daily treatment volume is 788,990 kl/d and this indicates that the treated volume is nominally less than the total SIV (99.7%). The reasons for this could be that 18 WTWs/ boreholes/ etc. are not measuring their average daily treatment volumes, and Rand Water (from its two WTWs) is distributing water to 2 WSSs in the Metsimaholo LM and Ngwathe LM from the Gauteng province to the Free State province. The largest contributors to the total SIV are from the Mangaung MM (Bloem Water) and Matjhabeng LM WTWs with a total SIV contribution of 405,203 kl/d (51%). Diagnostic no. 2 to follow herein will unpack these statistics in more detail.

The water distribution infrastructure is summarised in the table below.

Table 3 - Summary of Water Distribution Infrastructure

WSA Name	# WSS with no WSP/WB	# WSS with WSP/WB	Water Distribution Infrastructure			
			# Pump Stations (#)	Bulk Water Supply Lines (km)	Reticulation pipe lines (km)	# Reservoirs/ Towers
Dihlabeng LM	3		13	49	611	27
Kopanong LM		8	9	94	348	17
Letsemeng LM	5		14	74	161	20
Mafube LM	3		8	NI	NI	8
Maluti-a-Phofung LM	8		19	NI	NI	28
Mangaung	2	5	17	854	2,861	40
Mantsopa LM	4	1	2	NI	302	21
Masilonyana LM	4		2	NI	NI	9
Matjhabeng LM		6	11	60	1,700	14
Metsimaholo LM	2	1	13	NI	NI	14
Mohokare LM	3		0	209	NI	10
Moqhaka LM	3		17	NI	NI	19
Nala LM		1	2	NI	NI	4
Ngwathe LM	4	1	8	NI	NI	25
Nketoana LM	4		11	71	NI	16
Phumelela LM	3		9	11	NI	16
Setsoto LM	4		1	11	19	12
Tokologo LM	3		64	NI	NI	27
Tswelopele LM	2		8	48	170	8
Totals	**57**	**23**	**228**	**1,480**	**6,172**	**335**

Provincial Blue Drop Analysis

The 100% response from the 19 WSAs audited demonstrates a firm commitment to water services management in the province. Local Government reforms resulted in the merging of Naledi LM into Mangaung Metro. Therefore, 19 WSAs were audited in 2023 compared to the 20 WSAs in 2014.

Table 4 - Blue Drop Comparative Analysis from 2012 to 2023

BLUE DROP COMPARATIVE ANALYSIS				
Performance Category	**2012**	**2014**	**2023**	**Performance trend 2014 and 2023**
Incentive-based indicators				
WSAs assessed (#)	20 (100%)	20 (100%)	19 (100%)	→
Water supply systems assessed (#)	79	79	80	↑
Blue Drop scores ≥50% (#)	45 (57%)	54 (68%)	33 (41%)	↓
Blue Drop scores <50% (#)	34 (43%)	25 (32%)	47 (59%)	↓
Blue Drop Certifications (#)	7	6	0	↓
Lowest Technical Site Assessment Score (%)	9%	30%	28%	↓
Highest Technical Site Assessment Score (%)	98%	91%	95%	↑

NA = Not Applied NI = No Information *↑= improvement, ↓= regress, →= no change*

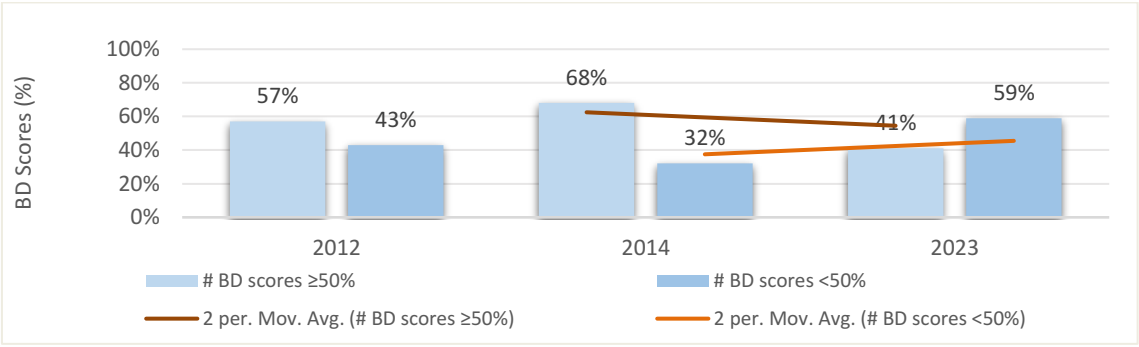


Figure 2 - Blue Drop trend analysis over the period 2012 to 2023, indicating the percentage BD scores above and below 50%

The trend analysis indicates that:

- The no. of systems audited has increased from 79 in 2014 to 80 in 2023
- The no. of systems with BD scores of ≥50% decreased from 54 (68%) in 2014 to 33 (41%) in 2023
- This trend was reversed with no. of systems with a BD score of ≤50% increasing from 25 (32%) in 2014 to 47 (59%) in 2023
- Blue Drop Certifications decreased from 6 awards in 2014 to 0 awards in 2023
- The lowest TSA score decreased from 30% in 2014 to 28% in 2023, with the highest TSA score increasing from 91% in 2014 to 95% in 2023
- An overall performance trend analyses indicates a regression in drinking water services from 2014 to 2023
- This negative trajectory reinforces the need for regular audits to ensure timely turnaround and continued improvement
- The negative trend also implies that performance has declined in the absence of regulatory engagement of the BD audits between 2014 to 2023.

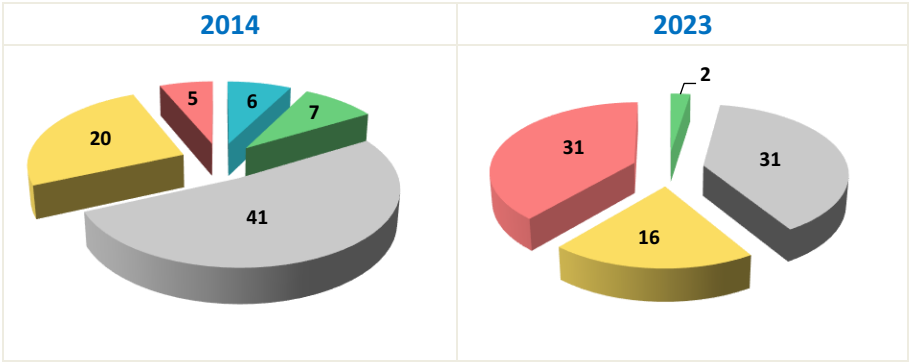


Figure 3 - No. WSSs in the Blue Drop score categories for 2014 and 2023 (graph legend to right)

Comparative analysis of the 2014 and 2023 blue drop scores indicates that only 2 system scores are in the >80-<95% (*Good Performance*) category, 31 systems reside in the >50-<80% (*Average Performance*) category, and 31 systems reside in the 0-<31% (*Critical state Performance*) category.

≥95 – 100% Excellent
≥80-<95% Good
≥50-<80% Average
31-<50% Poor
0-<31% Critical state

In summary, trends over the years 2014 and 2023 indicate as follows:

- 31 Systems in a 'critical state'
- Systems in a 'poor state' decreased from 20 to 16 systems
- Systems in an 'average state' decreased from 41 to 31 systems
- Systems in the 'excellent and good state' decreased from 13 systems (16%) to 2 systems (2.5%).

Provincial BDRR Analysis

The Blue Drop Risk Rating (BDRR) analysis assesses the risk across the entire water supply network. The BDRR formular was updated in 2021 to include an added risk indicator, i.e. 'E: Water Safety Plans', to address the risk assessment requirements outlined in SANS 241 of 2015. The BDRR now contains 5 risk indicators, i.e. design capacity (A), operational capacity (B), water quality compliance (C), technical capacity (D), and water safety plans (E). The results from the BDRR analyses are summarised in the table and figure following.

Table 5 - Municipal BDRR/BDRRmax Comparative Analysis from 2022 and 2023

BDRR/BDRR$_{max}$ COMPARATIVE ANALYSIS									
WSA Name	# WSSs	# WBs/ WSPs	2022 (BD PAT)	2023 (BD Audit)	Performance Trend 2022 and 2023	BDRR Risk Category Split			
						0-<50%	50-<70%	70-<90%	90-100%
Dihlabeng LM	3		71.8%	30.6%	↑	3			
Kopanong LM	8	8	82.6%	36.1%	↑	8			
Letsemeng LM	5		53.1%	55.5%	↓	1	4		
Mafube LM	3		95.1%	98.9%	↓				3
Maluti-a-Phofung LM	8		97.7%	93.4%	↑			3	5
Mangaung	7	5	72.5%	36.4%	↑	4	2	1	
Mantsopa LM	5	1	47.1%	50.5%	↓	2	3		
Masilonyana LM	4		69.0%	79.5%	↓			3	1
Matjhabeng LM	6	6	29.9%	57.9%	↓		6		
Metsimaholo LM	3	1	26.1%	30.2%	↓	3			
Mohokare LM	3		43.1%	45.6%	↓	2	1		
Moqhaka LM	3		63.4%	35.7%	↑	2	1		
Nala LM	1	1	45.6%	43.6%	↓	1			
Ngwathe LM	5	1	37.0%	42.6%	↓	1		2	2
Nketoana LM	4		46.3%	48.7%	↓	3	1		
Phumelela LM	3		96.6%	61.0%	↑		2	1	
Setsoto LM	4		58.7%	50.4%	↑	2	1	1	
Tokologo LM	3		100.0%	64.6%	↑		1	2	
Tswelopele LM	2		43.0%	23.2%	↑	2			
Totals & %BDRR/BDRR$_{max}$	**80**	**23**	**61.9%**	**57.1%**	↑	**34**	**22**	**13**	**11**

↑= improvement, ↓= regress, →= no change

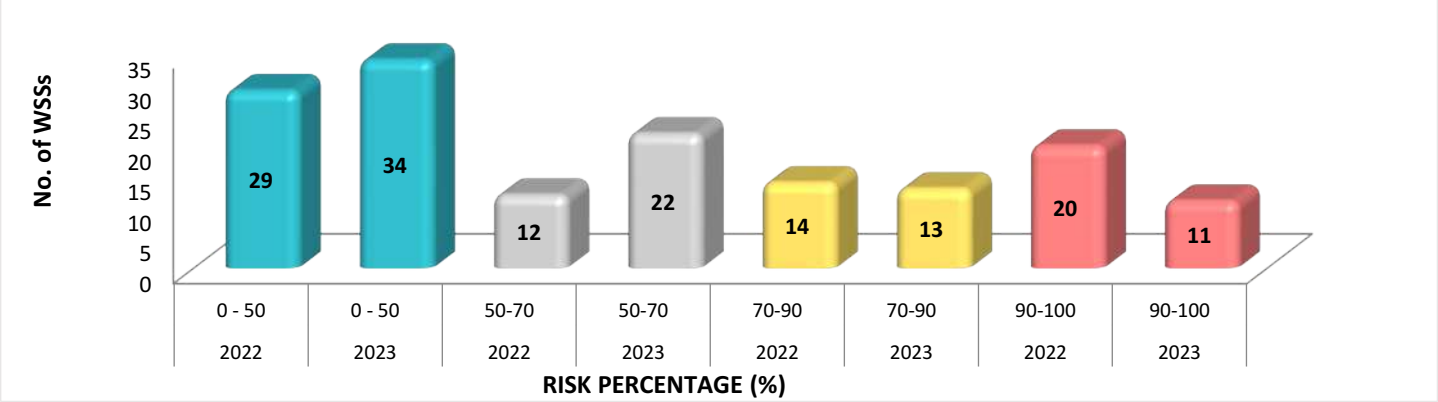


Figure 4 - a) WSS risk distribution and trends for 2022 and 2023; b) Colour legend

90 – 100% Critical risk
70 - <90% High Risk
50-<70% Medium risk
<50% Low Risk

Trend analysis of the BDRR ratings for 2022 and 2023 indicates that:

- The 2023 audit cycle highlighted a slightly progressive shift with an increase in the no. of low risk WSSs (29 to 34) and medium risk WSSs (12 to 22) but a proportional decrease in the high risk WSSs (14 to 13) and the critical risk WSSs (20 to 11).

Regulatory Enforcement

Water supply systems which fail to achieve the minimum Blue Drop target of 31%, are placed under regulatory focus. The Regulator requires these WSAs to submit a detailed corrective action plan (CAP) within 20 working days from publishing of this report. 31 WSSs received Blue Drop scores below 31%, and hence are placed under **regulatory surveillance**, in accordance with the Water Services Act (108 0f 1997). DWS together with COGTA will through the grant allocation systems ensure priority is given to application of grants to rectify/restore the water services treatment and supply shortcomings identified in this report.

Table 6 - WSSs with <31% Blue Drop scores

WSA Name	2023 BD Score	WSSs with <31% score
Mangaung	**62.8%**	Soutpan Krugersdrift Dam
Setsoto LM	**43.3%**	Clocolan, Senekal
Mantsopa LM	**42.3%**	Hobhouse, Thaba Phatchoa, Tweespruit
Ngwathe LM	**36.2%**	Parys, Vredefort, Koppies, Edenville boreholes
Moqhaka LM	**36.1%**	Steynsrus
Mohokare LM	**27.6%**	Rouxville, Smithfield, Zastron
Masilonyana LM	**25.5%**	Brandfort, Theunissen, Verkeerdevlei, Winburg
Tokologo LM	**24.8%**	Boshof, Dealesville
Maluti-a-Phofung LM	**17.7%**	Bluegumbosch, Kestell, Harankopane, Mphatlalatsane, Greater Qwaqwa, Makwane, Harrismith, Tshiame
Mafube LM	**4.3%**	Frankfort, Tweeling, Villiers

The following WSAs and their associated water supply systems are in high and/or critical BDRR risk positions, which means that some or all the risk indicators are in a precarious state, i.e. operational capacity, design capacity utilisation, water quality compliance, technical capacity, and water safety plans. WSS in high risk and critical risk positions pose a serious risk to public health. The following WSAs will be required to assess their risk contributors and to provide corrective measures in the above mentioned action plans to mitigate these risks.

Table 7 - %BDRR/BDRR$_{max}$ scores and WSSs in critical and high-risk space

WSA Name	2023 Average %BDRR/BDRRmax	WSSs in critical and high-risk space	
		Critical Risk (90-100%)	High Risk (70-<90%)
Mafube LM	98.9%	Frankfort, Tweeling, Villiers	
Maluti-a-Phofung LM	93.4%	Bluegumbosch, Greater Qwaqwa, Harrismith, Kestell, Tshiame	HaRankopane, Makwane, Mphatlalatsane
Mangaung	36.4%		Soutpan (Krugersdrift Dam)
Masilonyana LM	79.5%	Brandfort	Theunissen, Winburg, Verkeerdevlei
Ngwathe LM	42.6%	Edenville (Boreholes), Koppies	Parys, Vredefort
Phumelela LM	61.0%		Memel
Setsoto LM	50.4%		Senekal
Tokologo LM	64.6%		Boshof, Dealesville
Totals		**11 of 80 (14%)**	**13 of 80 (16%)**

Good practice risk management requires that the Water Safety Plans (WaSPs) are informed by meaningful Process and Condition Audits, supported by zealous implementation of corrective measures and ongoing monitoring of risk movement. With the exception of 56 water supply systems situated in the low and medium risk positions, the remaining 24 water supply systems are situated in the high and critical risk positions.

Performance Barometer

The **Blue Drop Performance Barometer** presents the individual WSA Blue Drop Scores, which essentially reflects the level of mastery that a WSA has achieved in terms of its overall water services business. The bar chart below compares the 2014 and 2023 BD scores, ranked from lowest to highest performing WSA in 2023. The Metsimaholo LM is commended for maintaining good performance. 6 WSAs have achieved average performance and 7 WSAs have achieved poor performance. The remaining 5 WSAs are in critical state and are therefore placed under regulatory focus.

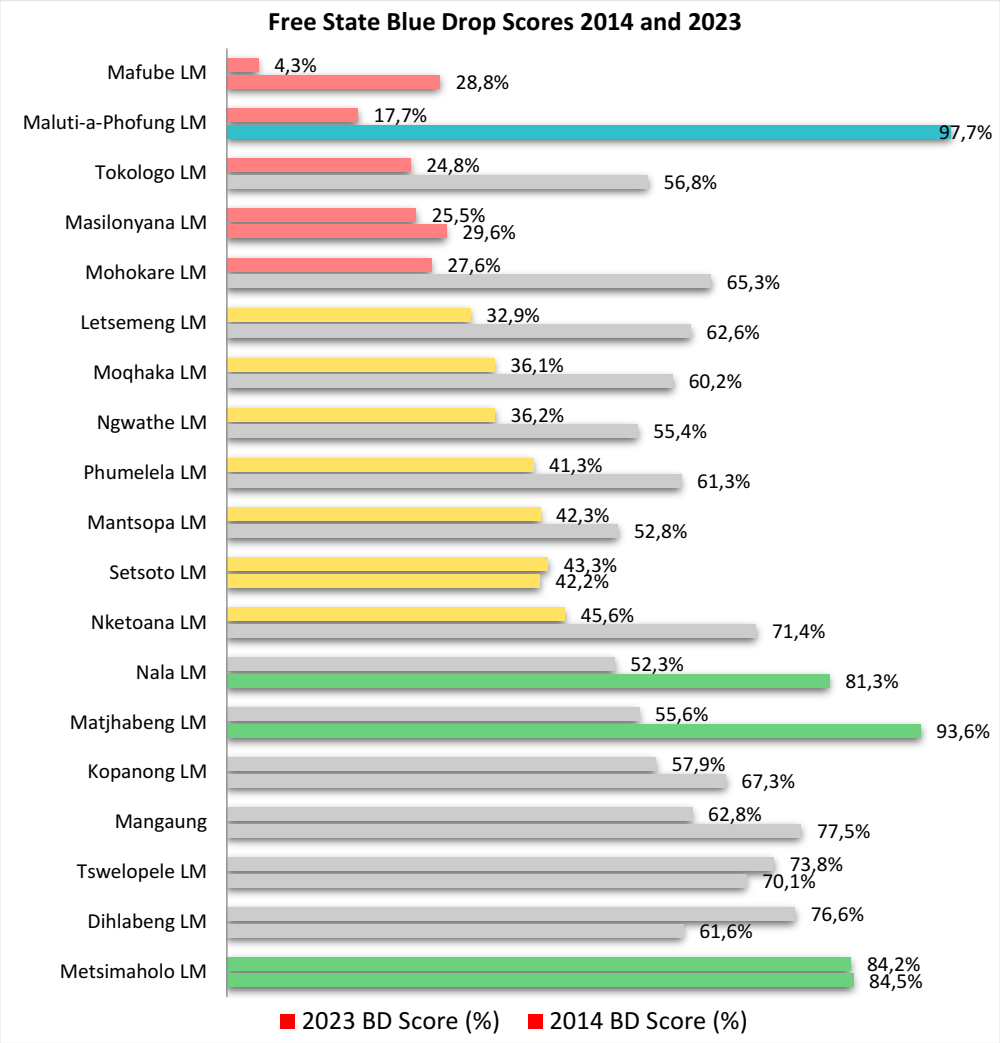


Figure 5 - a) Blue Drop scores 2014 (bar bottom) and 2023 (bar top); b) Colour legend

≥95 – 100% Excellent
≥80-<95% Good
≥50-<80% Average
31-<50% Poor
0-<31% Critical state

The **BDRR Risk Barometer** expresses the level of risk that a WSA poses in respect of its water supply system. The schematic below presents the BDRR in ascending order – with the low-risk WSAs on the left and higher risk WSAs to the far right. The analysis reveals that there are 6 medium, 1 high and 2 critical risk WSAs in the province. 10 WSAs are situated in the low risk positions.

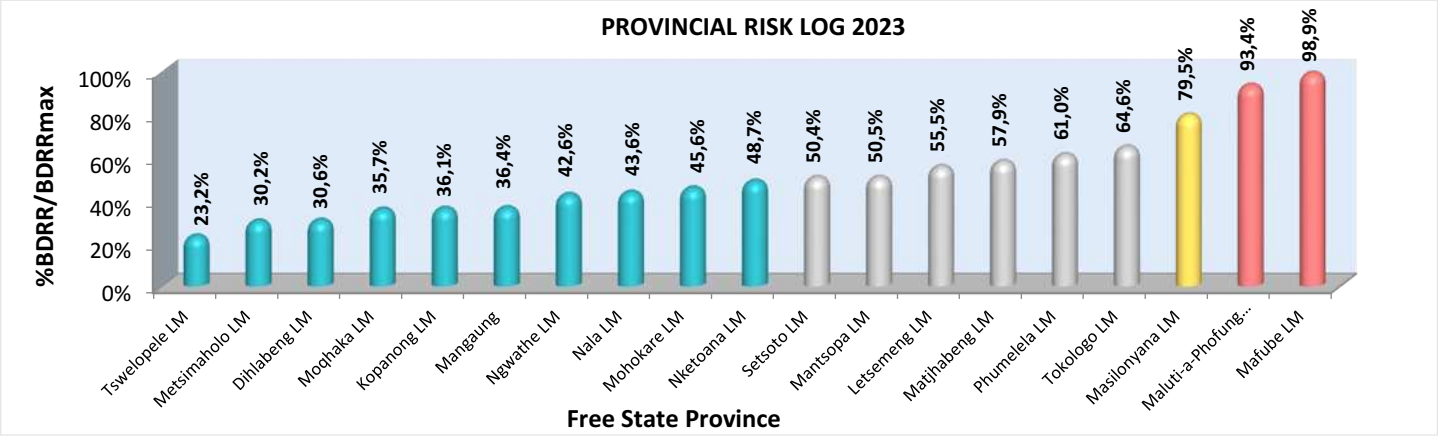


Figure 6 - a) %BDRR/BDRR$_{max}$ Risk Performance Profile/Log 2023; b) Colour legend

90 – 100% Critical risk
70 - <90% High Risk
50-<70% Medium risk
<50% Low Risk

Provincial Best Performers

The **Metsimaholo Municipality** is the **BEST PERFORMING WSA** in the province, based on the following record of excellence attributed mainly to the Sasolburg supply system supplied by Rand Water:

- ✓ 2023 Blue Drop Score of 84.2%
- ✓ 2014 Blue Drop Score of 84.5%
- ✓ All 3 systems (100%) in the low risk position
- ✓ TSA score of 73% for the Deneysville WTW.

The **Dihlabeng Municipality** is the second-best scoring WSA:

- ✓ 2023 Blue Drop Score of 76.6%
- ✓ 2014 Blue Drop Score of 61.6%
- ✓ All 3 systems (100%) in low risk position
- ✓ TSA score of 68% for the Clarens & Fouriesburg WTWs.

The **Tswelopele Municipality** is the third-best scoring WSA:

- ✓ 2023 Blue Drop Score of 73.8%
- ✓ 2014 Blue Drop Score of 70.1%
- ✓ All 2 systems (100%) in low risk positions
- ✓ TSA score of 82% for the Hoopstad WTW.

KPA Diagnostics

The BD audit process collects a vast amount of data that yield valuable insight into the state of the water services delivery and water quality in each province. Five focus areas or 'diagnostics' have been configured from the 2021/22 audit data and are discussed below.

Table 8 - Summary of the key diagnostic themes and reference to the respective Blue Drop KPAs

Diagnostic #	Diagnostic Description	Diagnostic Reference
1	**Technical Competence**	KPA 1, 2 & Bonus
2	**Treatment Capacity and Flow Distribution**	KPA 4 & Generic Audit data set
3	**Drinking Water Quality (DWQ) Monitoring and Compliance**	KPA 2 & 4 & Bonus
4	**Technical Site Assessments**	TSA and 2023 Blue Drop Watch Report
5	**Operation, Maintenance and Refurbishment of Assets**	KPA 3 & 4

Diagnostic 1: Technical Competence

Aim: This focus area assesses the technical human resources capacity that is available to manage and operate water treatment processes and maintain the related water infrastructure. Theory advocates that a correlation exists between human resources capacity and capability (sufficient number of appropriately qualified staff) and a WSI's performance. Thus, it is hypothesised that high HR capacity would translate to compliant water treatment plants and functional water supply network. Blue Drop assesses technical compliance on two levels: i) WTW plant supervision and process control staff and ii) Technical, scientific and maintenance staff.

(i) Plant Supervisors and Process Controllers

Findings: According to regulations, water treatment plants are classified as Class A, B, C, D or E plants. Similarly, Process Controllers and Plant Supervisors are registered as Class I, II, III, IV, V or VI Process Controller. Higher classed plants require a higher level of Process Controllers due to technology complexity and strict water quality standards. Technical compliance of PCs and Supervisors is determined against the Blue Drop standards, as defined by Reg. 2834 of the Water Act 1956 (Act 54 of 1956) for the erection, enlargement, operation, and registration of water care works and draft Reg. 813 of the Water Services Act (No 108 of 1997). Regulation 2834 has been replaced by Regulation 3630 in 2023 but will only come in effect during the next Blue Drop audit cycle.

Table 9 - No. compliant versus shortfall in Supervisor and Process Controller staff

WSA & WB Name	# WTWs	# WSSs	# Available Compliant Staff			Staff Shortfall		Ratio***	2023 BD Score (%)
			PCs	Supervisor**	Total	PCs	Supervisor		
Bloem Water now Vaal Central Water	7	11*	30	9	39	1	0	5.6	**57.9% ave.**
Bloem Water now Vaal Central Water (Sedibeng Water)	2	7	1	0	1	5	2	0.5	**54.6% ave.**
Dihlabeng LM	3	3	13	5	18	2	0	6.0	**76.6%**
Kopanong LM	6	8	25	5	30	2	0	7.3	**57.9%**
Letsemeng LM	5	5	4	5	9	10	0	1.8	**32.9%**
Mafube LM	3	3	5	3	8	5	0	2.7	**4.3%**
Maluti-a-Phofung LM	4	8	4	7	11	11	0	1.4	**17.7%**
Mangaung	7	7	0	1	1	11	0	3.0	**62.8%**
Mantsopa LM	4	5	12	5	17	8	0	3.4	**42.3%**
Masilonyana LM	4	4	4	0	4	11	4	1.0	**25.5%**
Matjhabeng LM	None	6							**55.6%**
Metsimaholo LM	2	3	1	0	1	7	1	0.3	**84.2%**
Mohokare LM	3	3	2	0	2	10	2	0.7	**27.6%**
Moqhaka LM	3	3	11	2	13	0	0	4.3	**36.1%**
Nala LM	None	1							**52.3%**
Ngwathe LM	4	5	11	1	12	7	1	2.4	**36.2%**
Nketoana LM	4	4	18	8	26	0	0	6.5	**45.6%**
Phumelela LM	4	3	10	0	10	6	2	3.3	**41.3%**
Setsoto LM	4	4	0	4	4	12	0	1.0	**43.3%**
Tokologo LM	4	3	0	0	0	11	2	0.0	**24.8%**
Tswelopele LM	2	2	3	3	6	3	0	3.0	**73.8%**
Totals	**75**	**80**	**154**	**58**	**172**	**122**	**14**		

Note: Nala LM and Matjhabeng LM have no WTWs of their own. Water is supplied by the previously Sedibeng owned WTWs

* Bloem Water supplies water to 14 WSSs. However, Bloem Water owns 7 WTWs that supply water to 11 of the 14 WSSs in the province

** NB: The Supervisor totals will be inflated as it is not possible to differentiate between which Supervisors are shared/ roaming with other Class C to E WTWs

*** Ratio depicts the no. of qualified staff divided by the no. of WTWs operated by this no. of staff. E.g., Dihlabeng has 18 compliant Sups + PCs, divided by 3 WTWs = 6 qualified staff per WTW

Note: "Compliant staff" means qualified and registered staff that meets the BD standard for a particular Class Works. "Staff shortfall" means staff that do not meet the BD standard for a particular Class of works (+1 for a shift) and/or staffing gaps exist at the respective WTWs.

Competent human resources are vital enablers in ensuring efficient and sustainable management of water services and delivery of safe water quality to consumers. For the province in general, the operational competencies are found to be excellent for the Supervisory staff in Bloem Water (now VCW) and 11 municipalities and excellent for the PCs in Bloem Water (now VCW) and only 2 of 17 municipalities (excluding Matjhabeng LM and Nala LM), as illustrated in the table above.

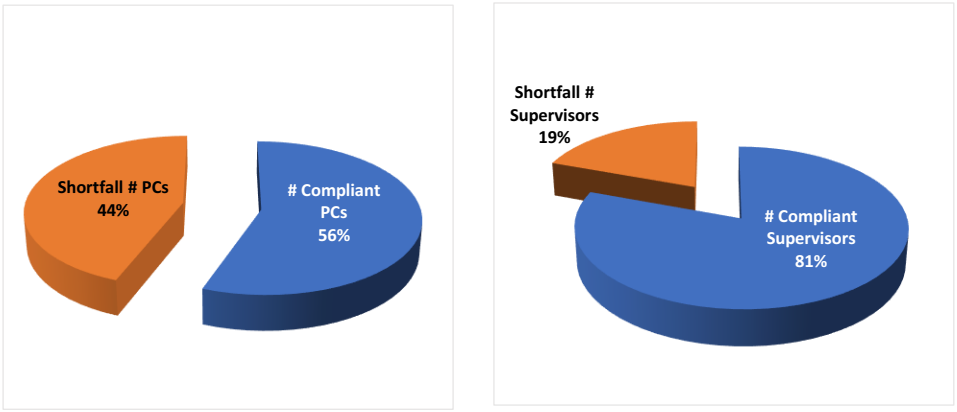


Figure 7 - Schematic illustration of compliant and shortfall of Supervisors (a) and Process Controllers (b)

Plant Supervisors: The pie charts indicate that 81% (58 of 72) of Plant Supervisors complies with the Blue Drop standard with a shortfall of 19% (14 of 72) for 7 WSAs. The highest shortfall is for the Masilonyana LM.

Process Controllers: Similarly, 56% (154 of 276) of the PC staff complies with the required standards, with a shortfall of 44% (122 of 276) for all the WSAs with the exception of Moqhaka LM and Nketoana LM. The highest shortfall (ranging from 5 to 12 PCs) are for 13 of the WSAs.

Blue Drop standards require of Class A and B plants to employ dedicated Supervisors per WTW and Process Controllers per shift per works, whereas Class C to E plants may share staff across works. Shifts have been introduced to ensure optimal operations while addressing security risks, particularly as it relates to theft and vandalism. Telemetry also reduces the requirement for on-site staff during night shifts, but these relaxations have to be done within the DWS regulatory guidelines.

The Regulator expects correlation between the competence of an operational team and the performance of a WTW, as measured by the BD score. The data indicates as follows:

- 15 WSAs have some qualified PCs in place, with the exception of Setsoto LM, Tokologo LM and Mangaung MM (excluding Bloem Water) WTWs
- 12 WSAs have qualified Supervisors in place. It was not clear for roaming Supervisors linked to Class C to E WTWs
- 6 WSAs have shortfalls in Supervisors and 15 WSAs have shortfalls in qualified Process Controllers.

It is expected that a correlation would exist between the competence of an operational team and the performance of a water treatment works, as measured by the BD score. The results from the ratio analysis indicate high ratios ($\geq$3.0) for 8 WSAs.

Overall, the comparative bar chart does not provide a close correlation between the ratios (ranging from 3.0 to 5.5) and the BD scores as they appear to be too erratic with exceptions for Dihlabeng LM, Kopanong LM, Mangaung MM and Tswelopele LM. The anomalies are for Matjhabeng LM because of the Balkfontein WTW that has a huge shortfall in PC staff and for Metsimaholo LM Sasolburg WSS that receives water from Rand Water.

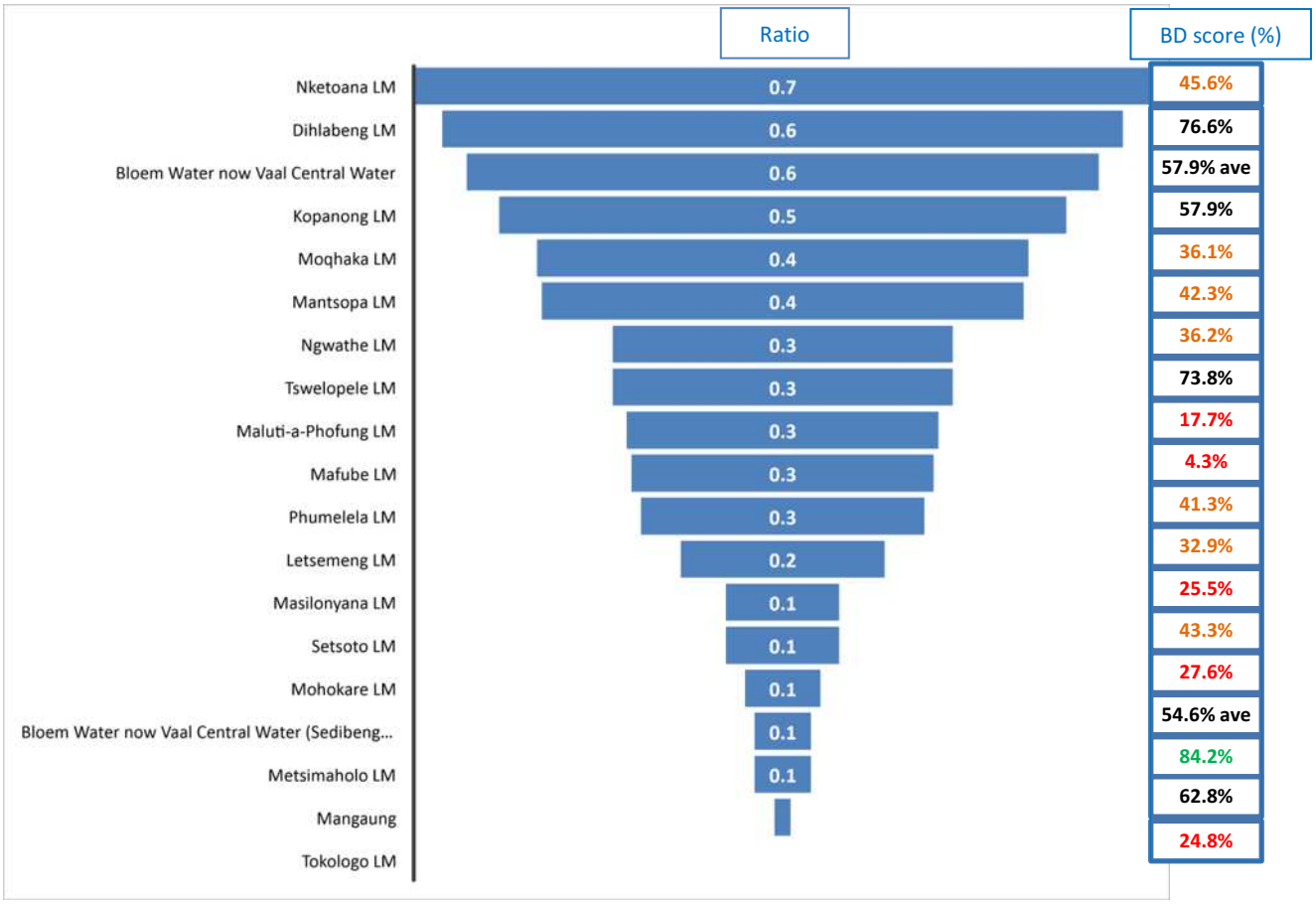


Figure 8 - Ratio of compliant operational staff to no. of WTWs and Comparison of Ratios with BD scores

(ii) Technical, Scientific and Maintenance staff

In addition to operational capacity (above), good management practice also requires access to qualified engineers, technicians, technologists, MISA appointees, scientists, and maintenance capability (below). Such competencies could reside in-house or accessible through term contracts and external specialists.

Table 10 - Summary of the maintenance capacity and no. of qualified and shortfall of Engineering, Technical and Scientific staff

WSA & WB Name	# WTWs	# WSSs	Maintenance Arrangement
Bloem Water now Vaal Central Water	7	11*	Internal+Specific Outsourcing
Bloem Water now Vaal Central Water (Sedibeng Water)	2	7	Internal+Specific Outsourcing
Dihlabeng LM	3	3	Internal+Term Contract
Kopanong LM	6	8	Internal+Specific Outsourcing; Partially Capacitated
Letsemeng LM	5	5	Partially Capacitated
Mafube LM	3	3	Internal Team (only); No Capacity
Maluti-a-Phofung LM	4	8	Internal Team (only); Partially Capacitated
Mangaung	7	7	Internal+Specific Outsourcing
Mantsopa LM	4	5	Internal+Specific Outsourcing
Masilonyana LM	4	4	Inadequate Capacity
Matjhabeng LM	None	6	Internal+Specific Outsourcing
Metsimaholo LM	2	3	Internal+Term Contract; Internal+Specific Outsourcing (Rand Water)
Mohokare LM	3	3	Internal Team (only)
Moqhaka LM	3	3	Internal Team (only)
Nala LM	None	1	Internal+Specific Outsourcing
Ngwathe LM	4	5	Internal+Specific Outsourcing (Rand Water); Inadequate Capacity
Nketoana LM	4	4	Internal Team (only)
Phumelela LM	4	3	Internal+Term Contract; Internal+Specific Outsourcing
Setsoto LM	4	4	Internal+Term Contract
Tokologo LM	4	3	Inadequate Capacity
Tswelopele LM	2	2	Internal+Term Contract
Totals	**75**	**80**	

Note: Nala LM and Matjhabeng LM have no WTWs of their own. Water is supplied by the previously Sedibeng owned WTWs
* Bloem Water supplies water to 14 WSSs. However, Bloem Water owns 7 WTWs that supply water to 11 of the 14 WSSs in the province

WSA & WB Name	# WTWs	# WSSs	Qualified Technical Staff (#)					Technical Shortfall (#)	Qualified Scientists (#)	Scientists Shortfall (#)	Ratio*	2023 BD Score (%)
			Technicians	Technologists	Engineers	MISA appointees	Total					
Bloem Water now Vaal Central Water	7	11	1	3	1	0	**5**	0	1	1	0.5	**57.9% ave.**
Bloem Water now Vaal Central Water (Sedibeng Water)	2	7	4	10	2	0	**16**	0	0	2	2.3	**54.6% ave.**
Dihlabeng LM	3	3	1	4	0	0	**5**	1	0	2	1.7	**76.6%**
Kopanong LM	6	8	1	2	1	0	**4**	0	0	2	0.5	**57.9%**
Letsemeng LM	5	5	2	0	0	0	**2**	2	0	2	0.4	**32.9%**
Mafube LM	3	3	0	1	0	0	**1**	3	0	2	0.3	**4.3%**
Maluti-a-Phofung LM	4	8	4	0	0	0	**4**	2	0	2	0.5	**17.7%**
Mangaung	7	7	1	2	0	0	**3**	1	1	1	0.4	**62.8%**
Mantsopa LM	4	5	1	2	1	0	**4**	0	1	1	0.8	**42.3%**
Masilonyana LM	4	4	3	1	0	0	**4**	1	0	2	1.0	**25.5%**
Matjhabeng LM	None	6									0.0	**55.6%**
Metsimaholo LM	2	3	0	2	0	0	**2**	2	0	2	0.7	**84.2%**
Mohokare LM	3	3	3	0	0	0	**3**	2	0	2	1.0	**27.6%**
Moqhaka LM	3	3	1	0	0	0	**1**	3	0	2	0.3	**36.1%**
Nala LM*	None	1									0.0	**52.3%**
Ngwathe LM	4	5	0	0	0	0	**0**	4	0	2	0.0	**36.2%**
Nketoana LM	4	4	1	1	0	0	**2**	2	0	2	0.5	**45.6%**
Phumelela LM	4	3	0	2	0	0	**2**	2	0	2	0.7	**41.3%**
Setsoto LM	4	4	2	1	0	0	**3**	1	0	2	0.8	**43.3%**
Tokologo LM	4	3	3	1	0	0	**4**	1	0	2	1.3	**24.8%**
Tswelopele LM	2	2	1	1	0	0	**2**	2	0	2	1.0	**73.8%**
Totals	**75**	**80**	**29**	**33**	**5**	**0**	**67**	**29**	**3**	**35**		

Note: Nala LM and Matjhabeng LM have no WTWs of their own. Water is supplied by the previously Sedibeng owned WTWs

* The single number ratio depicts the no. of qualified technical staff divided by the no. of WSSs that have access to the staff. E.g., Dihlabeng has 5 qualified staff, divided by 3 WSSs = 1.7 qualified staff per WSS

Note 1: "Qualified Technical Staff" means staff appointed in positions to support water services, and who has the required qualifications. "Technical Shortfall" is calculated based on a minimum requirement of at least 3 Engineers or more than 1 of each of Engineers, Technologists & Technicians; and at least one 1 Candidate Scientist and 1 Professional Scientist per WSI.

Note 2: "Qualified Scientists" means professional registered scientists (SACNASP) and candidate scientists appointed in positions to support water services. "Scientists shortfall" means that the WSA does not have at least one qualified SACNASP registered scientist and at least one 1 candidate scientist in their employ or contracted.

In terms of maintenance capacity, all the municipalities in the province have a reasonable contingent of qualified technical and maintenance staff. The maintenance staff comprises of a collective of in-house, contracted, or outsourced personnel. The data indicates that:

- 3 of 19 (16%) WSAs have in-house maintenance teams only
- 5 of 19 (26%) WSAs have internal maintenance teams supplemented with term contracts
- 8 of 19 (42%) WSAs have internal maintenance teams supplement with specific outsourced services
- 7 of 19 (37%) WSAs as a whole or in part are partially capacitated, inadequately capacitated, and have no capacity.

In general, the province presents a strong case for qualified professional technical staff as follows:

- A total of 67 qualified staff comprised of 5 Engineers, 33 Technologists, 29 Technicians, No MISA appointees (qualified); and 3 SACNASP registered scientists are assigned to the Water Boards and 19 WSAs
- A total shortfall of 64 persons is identified, consisting of 29 technical staff and 35 scientists
- 15 WSAs have a total shortfall of 29 qualified technical staff with the highest indicated for Ngwathe LM (4 no.), Mafube LM and Moqhaka LM (3), and 7 other WSAs (2)
- The Water Boards and 15 WSAs have access to credible laboratories that comply with the Blue Drop standards.

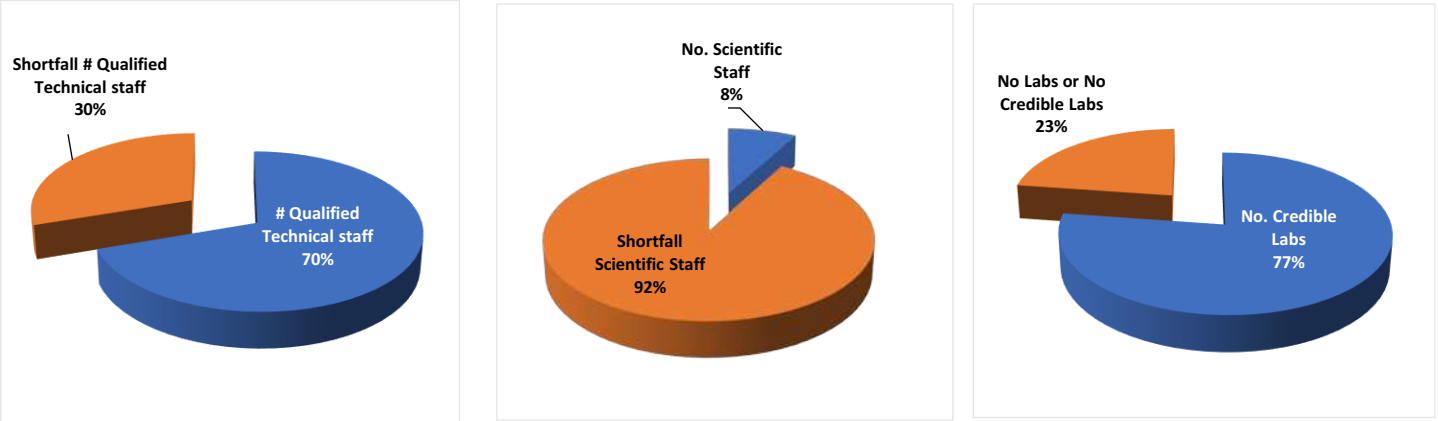


Figure 9 - Graphic illustration of the number and %: a) qualified engineering/technical staff; b) professional scientists; c) access to credible laboratory services that complies with Blue Drop standards

Ratio analysis has been done to determine the number of qualified technical and scientific staff assigned per WSS. It is expected that a higher ratio would correspond with well-performing and maintained water supply systems, as represented by the BD score.

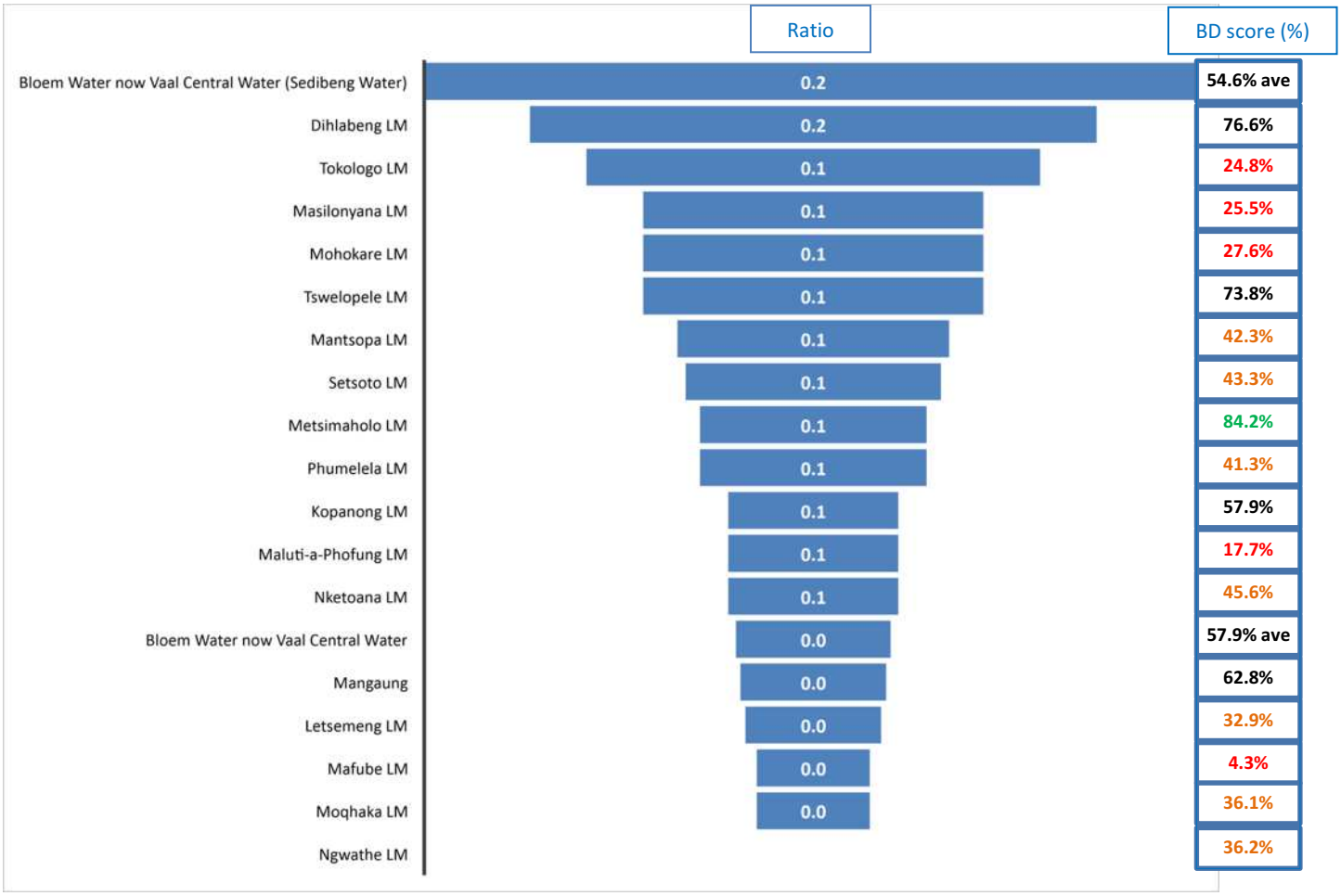


Figure 10 - Ratio of compliant technical staff to no. of WSSs and Comparison of Ratios with BD scores

The schematic above does show some correlation between medium ratios (≥ 1.0) and average BD scores with 3 WSA anomalies with <31% BD scores. Metsimaholo LM has a high BD score because of the Sasolburg system that receives water from Rand Water. Unlike the Green Drop 2022 diagnostics, no firm correlation can be drawn between technical capacity and water supply performance, mostly as result of the complexity of the WSA/Bulk Water Provider arrangement.

Overall, the results highlight the inter-dependency between technical capacity and performance. One of the options to enhance operational capacity is through dedicated training programmes. The Blue Drop audit incentivises training of operational staff over the 2-year period prior to the audit date. The results are summarised as follows:

Table 11 - No. of WTWs with operational staff sent on training over the past 2 years and vice versa

WSA & WB Name	# WTWs	# WTW staff attending training	# WTW without training
Bloem Water now Vaal Central Water	7		7
Bloem Water now Vaal Central Water (Sedibeng Water)	2		2
Dihlabeng LM	3	3	
Kopanong LM	6		6
Letsemeng LM	5		5
Mafube LM	3		3
Maluti-a-Phofung LM	4		4
Mangaung	7		7
Mantsopa LM	4		4
Masilonyana LM	4		4
Matjhabeng LM	None		
Metsimaholo LM	2	2	
Mohokare LM	3		3
Moqhaka LM	3	3	
Nala LM	None		
Ngwathe LM	4	3	1
Nketoana LM	4	4	
Phumelela LM	4		4
Setsoto LM	4		4
Tokologo LM	4	4	
Tswelopele LM	2		2
Totals	**75**	**19 (25%)**	**56 (75%)**

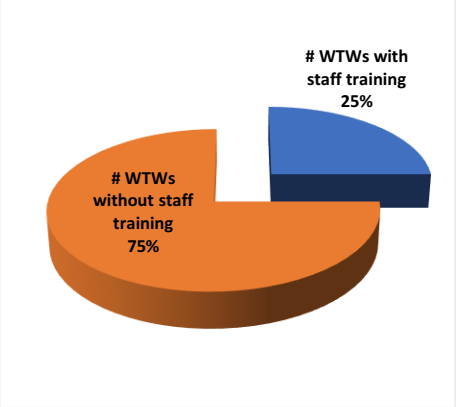


Figure 11 - %WTWs that have trained operational staff over the past two years

The results confirm that only staff members from 6 WSAs had staff attend training for 19 WTWs over the past 2 years. Overall, only 25% of operational staff attended safety and technical training, with the balance of 75% not partaking in any skills development initiatives. Investment in human capital through technical skills development is likely to mitigate some of the water quality failures and lower performances noted, and municipalities and water boards should prioritise ongoing skills development of technical staff and appointment of qualified staff that are legible for registration.

Diagnostic 2: Treatment Capacity and Flow Distribution

Aim: Diagnostic 2 deals with design and flow related dynamics, comprising of: i) design capacity and operational flow, ii) raw water abstraction, and iii) WUE and SIV.

(i) Design Capacity and Operational Flow

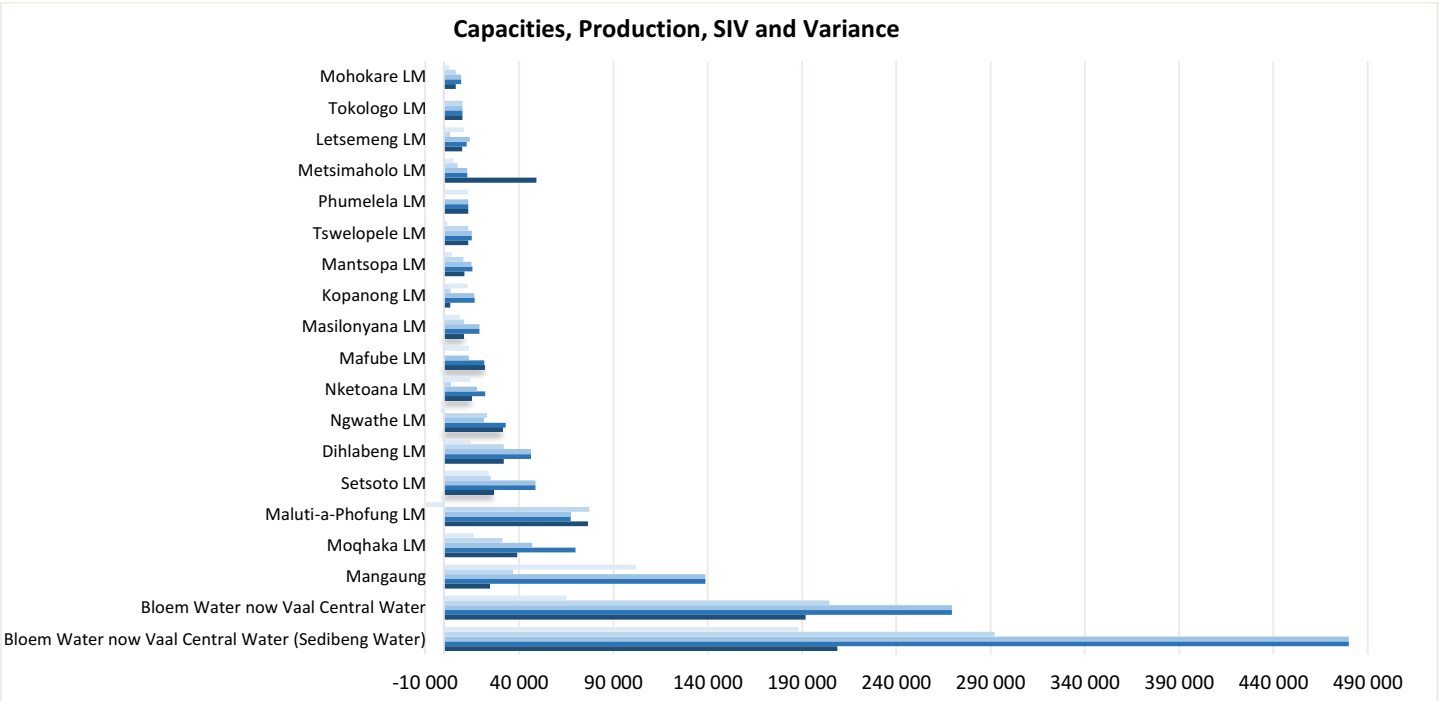
This diagnostic assesses the status of plant design capacity and daily water production at the WTWs, as well as SIVs as measured at the outflow from the WTW or inflow to the water distribution network. A capable WTW requires adequate installed design capacity and functional equipment to operate optimally. If the WTW design capacity is exceeded by the average daily production (treatment) volume, the WTW will not be able to deliver SANS compliant water quality. The available design capacity is typically exceeded when the water demand exceeds the installed design capacity, or when unit processes or equipment are dysfunctional, or when electrical supply problems render treatment and pumping of water defective. Typically, the production volume and SIV is the same if 1 WTW supplies 1 WSS, but different if multiple supply systems are feeding from a singular WTW.

Findings: Analysis of the design capacity and average daily production/ treatment volume indicate a total design capacity of 1,318,086 kl/d for the province, with a total average daily treatment (operational) volume of 788,990 kl/d. Theoretically, this implies that 60% of the design capacity is used with 40% available to meet additional water demand. However, the full 1,318,086 kl/d is not available as some infrastructure is dysfunctional, leaving 1,272,308 kl/d available. The capacity differential (difference between the installed and available capacity) means that the province is closer to its total available design capacity (62%) with a 38% surplus available. This capacity differential will not constrain or impede any further social and economic development in the drainage areas. 5 WSAs do not report or have not knowledge of their available capacities, and a lower figure than 38% surplus available can be expected.

Table 12 - Summary of WTWs design and available capacities, average daily production, % available capacity, and total SIV towards the WSSs

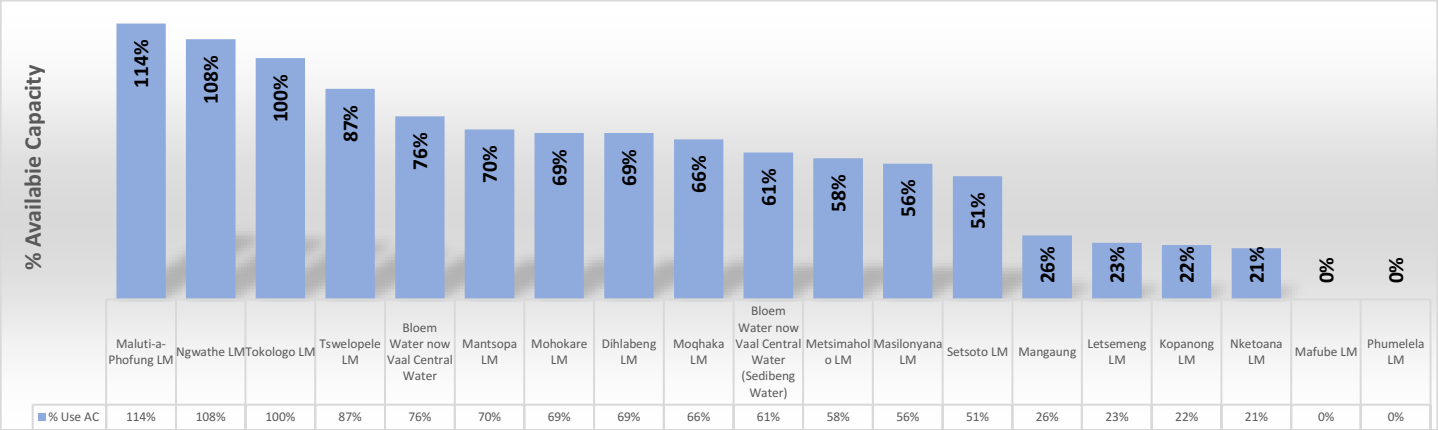
WSA & WB Name	# WTWs	# WSSs	Design Capacity (kl/d)	Available Design Capacity (kl/d)	Average Daily Production (kl/d)	Available Variance** (kl/d)	% Use Available Capacity	Total SIV towards the WSS (kl/d)
Bloem Water now Vaal Central Water	7	11*	269,423	269,423	204,469	64,954	76%	191,867
Bloem Water now Vaal Central Water (Sedibeng Water)	2	7	480,000	480,000	292,000	188,000	61%	208,758
Dihlabeng LM	3	3	46,185	46,188	31,867	14,321	69%	31,867
Kopanong LM	6	8	16,371	16,216	3,644	12,572	22%	3,372
Letsemeng LM	5	5	12,057	13,710	3,210	10,500	23%	9,782
Mafube LM	3	3	21,400	13,350	0	13,350	0%	21,400
Maluti-a-Phofung LM	4	8	67,200	67,400	77,064	-9,664	114%	76,443
Mangaung	7	7	138,800	138,800	36,723	102,077	26%	24,465
Mantsopa LM	4	5	15,160	14,690	10,355	4,335	70%	10,913
Masilonyana LM	4	4	18,948	18,948	10,650	8,298	56%	10,650
Matjhabeng LM	None	6						
Metsimaholo LM	2	3	12,490	12,490	7,300	5,190	58%	49,071
Mohokare LM	3	3	9,124	9,124	6,297	2,827	69%	6,296
Moqhaka LM	3	3	69,800	46,900	31,104	15,796	66%	38,904
Nala LM*	None	1						
Ngwathe LM	4	5	32,884	21,325	22,988	-1,663	108%	30,988
Nketoana LM	4	4	22,000	17,500	3,700	13,800	21%	14,700
Phumelela LM	4	3	13,000	13,000	0	13,000	0%	13,000
Setsoto LM	4	4	48,550	48,550	24,812	23,738	51%	26,360
Tokologo LM	4	3	9,894	9,894	9,894	0	100%	9,894
Tswelopele LM	2	2	14,800	14,800	12,913	1,887	87%	12,913
Totals	**75**	**80**	**1,318,086**	**1,272,308**	**788,990**	**483,318**	**62%**	**791,643**

Note: Nala LM and Matjhabeng LM have no WTWs of their own. Water is supplied by the previously Sedibeng owned WTWs
* Bloem Water supplies water to 14 WSSs. However, Bloem Water owns 7 WTWs that supply water to 11 of the 14 WSSs in the province
** Difference between the available design capacity and the average daily production



	Bloem Water now Vaal Central Water (Sedibeng Water)	Bloem Water now Vaal Central Water	Mangaung	Moqhaka LM	Maluti-a-Phofung LM	Setsoto LM	Dihlabeng LM	Ngwathe LM	Nketoana LM	Mafube LM	Masilonyana LM	Kopanong LM	Mantsopa LM	Tswelopele LM	Phumelela LM	Metsimaholo LM	Letsemeng LM	Tokologo LM	Mohokare LM
Available Variance (kl/d)	188 000	64 954	102 077	15 796	-9 664	23 738	14 321	-1 663	13 800	13 350	8 298	12 572	4 335	1 887	13 000	5 190	10 500	0	2 827
Ave. Daily Production (kl/d)	292 000	204 469	36 723	31 104	77 064	24 812	31 867	22 988	3 700	0	10 650	3 644	10 355	12 913	0	7 300	3 210	9 894	6 297
Available Design Capacity (kl/d)	480 000	269 423	138 800	46 900	67 400	48 550	46 188	21 325	17 500	13 350	18 948	16 216	14 690	14 800	13 000	12 490	13 710	9 894	9 124
Design Capacity (kl/d)	480 000	269 423	138 800	69 800	67 200	48 550	46 185	32 884	22 000	21 400	18 948	16 371	15 160	14 800	13 000	12 490	12 057	9 894	9 124
Total SIV (kl/d)	208 758	191 867	24 465	38 904	76 443	26 360	31 867	30 988	14 700	21 400	10 650	3 372	10 913	12 913	13 000	49 071	9 782	9 894	6 296

Figure 12 - Design and available capacity, average daily production, available variance and total SIV for the WTWs



Note: Maluti- Maluti-a-Phofung LM has 2 WTWs where the average daily production is exceeding the available capacity

Figure 13 - % available capacity

In sum, all WSAs have knowledge of their WTW installed design and available capacities. The average daily production is not known for 12 WTWs somewhat skewing the WSA data sets and for the province overall. The % use of installed and available capacity is not known for 3 WSAs.

(ii) Raw Water Abstraction

This diagnostic takes a snapshot view of the status of water abstraction authorisations from natural water resources across the province. As per the National Water Act (Act no 36 of 1998), Water Use Authorisation (WUA) mandate the maximum abstraction volumes of raw water, and the installation and monitoring of abstraction, inflow and outflow meters, whilst the BD audit requires WSAs to report the flows on IRIS and to calibrate meters annually. Any defects in terms of abstracting water from a resource without an authorisation, or exceeding the authorised volume, or reporting inaccurate volumes, or not monitoring abstraction against authorised volumes, are considered to be a regulatory risk and contravention of the law.

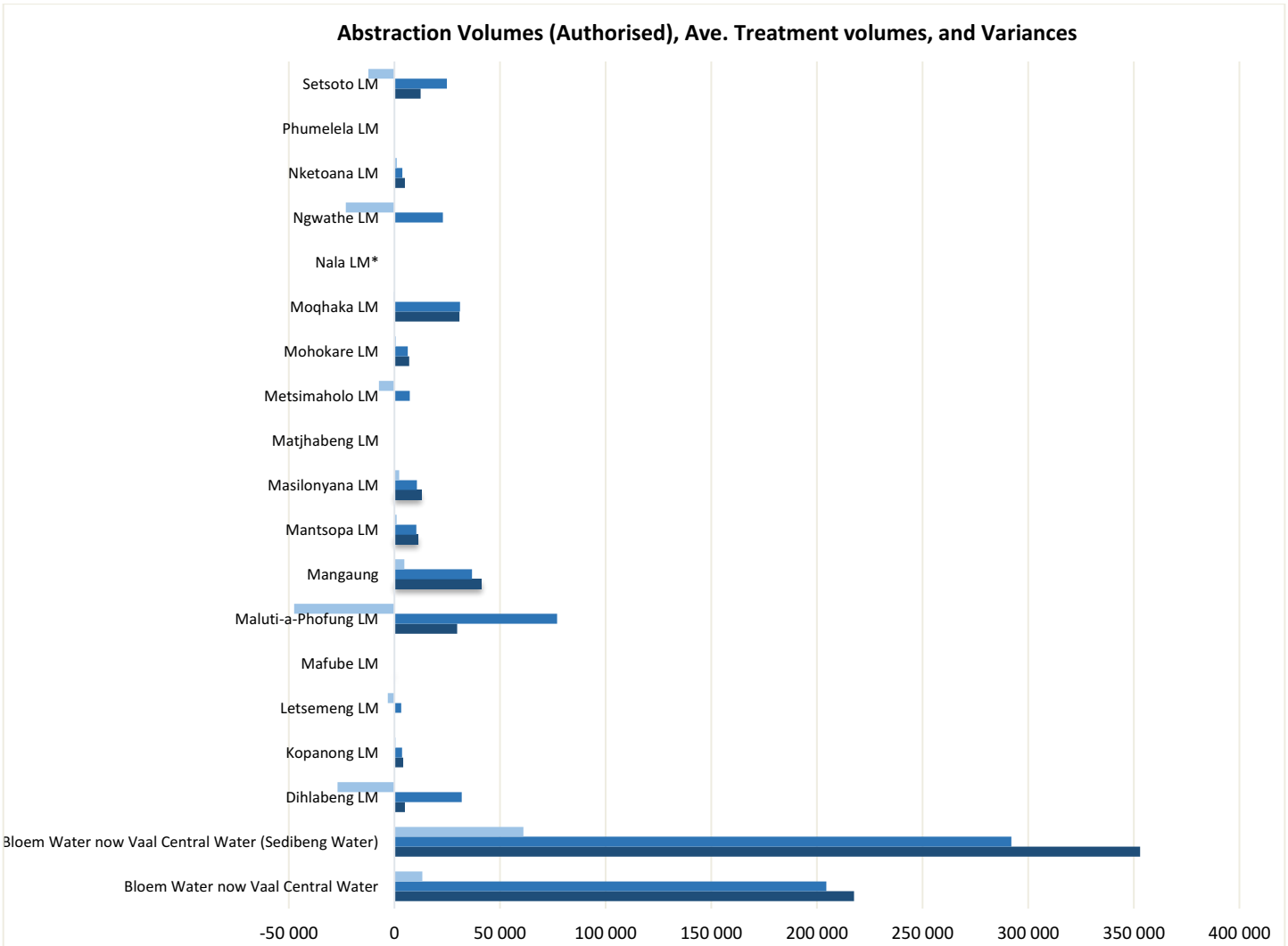
Findings: Data pertaining to the daily abstraction volumes (kl/d) (Authorised), average daily treatment volumes (kl/d), the names of the WTWs exceeding/with no Daily Abstraction Volumes (Authorised) and Average Daily Treatment Volumes (Authorised) is captured in the tables below.

Table 13 - Summary of Abstraction Volumes (Authorised), Average Daily Treatment Volumes, Variances & WTWs listed For Enforcement Action

WSA & WB Name	# WTWs	# WSSs	Daily Abstraction Volumes (Authorised) (kl/d)	Average Daily Treatment Volume (kl/d)	Average Variance (kl/d) [+ or Minus]
Bloem Water now Vaal Central Water	7	11	217,618	204,469	13,149
Bloem Water now Vaal Central Water (Sedibeng Water)	2	7	353,000	292,000	61,000
Dihlabeng LM	3	3	5,000	31,867	-26,867
Kopanong LM	6	8	4,110	3,644	466
Letsemeng LM	5	5	0	3,210	-3,210
Mafube LM	3	3	0	0	0
Maluti-a-Phofung LM	4	8	29,633	77,064	-47,431
Mangaung	7	7	41,353	36,723	4,630
Mantsopa LM	4	5	11,394	10,355	1,039
Masilonyana LM	4	4	12,950	10,650	2,300
Matjhabeng LM	None	6			
Metsimaholo LM	2	3	0	7,300	-7,300
Mohokare LM	3	3	6,968	6,297	671
Moqhaka LM	3	3	30,842	31,104	-262
Nala LM*	None	1			
Ngwathe LM	4	5	0	22,988	-22,988
Nketoana LM	4	4	4,900	3,700	1,200
Phumelela LM	4	3	0	0	0
Setsoto LM	4	4	12,456	24,812	-12,356
Tokologo LM	4	3	3,213	9,894	-6,681
Tswelopele LM	2	2	7,311	12,913	-5,602
Totals	**75**	**80**	**740,748**	**788,990**	**-48,242**

Note: Nala LM and Matjhabeng LM have no WTWs of their own. Water is supplied by the previously Sedibeng owned WTWs

WSA & WB Name	WTW exceeding the Daily Abstraction Volumes (Authorised)	WTW with no Daily Abstraction Volumes (Authorised)
Bloem Water now Vaal Central Water		Groothoek, Jagersfontein Boreholes,
Bloem Water now Vaal Central Water (Sedibeng Water)	Virginia	
Dihlabeng LM		Saulspoort, Clarens
Kopanong LM		Reddersburg
Letsemeng LM		All 4 WTWs
Mafube LM		All 3 WTWs
Maluti-a-Phofung LM	Wilge	Fika Patso, Makwane
Metsimaholo LM		Deneysville, Oranjeville
Moqhaka LM		Steynsrus, Viljoenskroon
Ngwathe LM		Edenville Boreholes, Koppies, Parys, Vredefort
Nketoana LM		Reitz
Phumelela LM		Memel, Vrede, Warden
Setsoto LM	Ficksburg	Clocolan, Senekal Cyferfontein Old & New, Senekal De Put
Tokologo LM		Boshof, Dealesville, Hertzogville
Tswelopele LM	Bultfontein, Hoopstad	
Totals	**5**	**33**



	Bloem Water now Vaal Central Water	Bloem Water now Vaal Central Water (Sedibeng Water)	Dihlabeng LM	Kopanong LM	Letsemeng LM	Mafube LM	Maluti-a-Phofung LM	Mangaung	Mantsopa LM	Masilonyana LM	Matjhabeng LM	Metsimaholo LM	Mohokare LM	Moqhaka LM	Nala LM*	Ngwathe LM	Nketoana LM	Phumelela LM	Setsoto LM
Average Variance (kl/d)	13 149	61 000	-26 867	466	-3 210	0	-47 431	4 630	1 039	2 300		-7 300	671	-262		-22 988	1 200	0	-12 356
Average Daily Treatment Volume (kl/d)	204 469	292 000	31 867	3 644	3 210	0	77 064	36 723	10 355	10 650		7 300	6 297	31 104		22 988	3 700	0	24 812
Daily Abstraction Vol (Authorized) (kl/d)	217 618	353 000	5 000	4 110	0	0	29 633	41 353	11 394	12 950		0	6 968	30 842		0	4 900	0	12 456

Figure 14 - Abstraction Volumes (Authorised), Average Daily Treatment Volumes, Variances

WTWs that exceed the Daily Abstraction Volumes (Authorised) and WTWs with no Daily Abstraction Volumes (Authorised) are reflected in the 2nd table above. WTWs that are not complying with the regulations will be required to show correction in the next Blue Drop audit cycle. The results conclude that no WTWs are exceeding the permitted abstraction limits and all WTWs provided authorised water use abstraction volumes. The Daily Abstraction Volumes (Authorised) are not known for 13 water treatment systems resulting in negative average variances that skew the data sets. Only one negative average variance could be clearly attributed to the Tswelopele LM for over abstraction. For future BD audits, WSA/WSPs will be required to provide 'actual' abstraction volumes so that a comparative analysis can be undertaken of the 'actual' abstraction volume versus the authorised water use abstraction volumes (maximum). This would require that the WSAs and WSPs/WBs monitor and record all critical path flows (abstraction, raw and final).

(iii) Water Use Efficiency and System Input Value

The Department is committed to consider issues related to water scarcity and security, aiming to ensure there is sufficient water for the population, the economy, and the environment by increasing water use efficiency across all sectors. Water use for services sectors is specifically dealing with the quantity of water used directly by the consumer through the public distribution network and industries connected to the network. This diagnostic assesses the water use efficiency (i.e., the average daily consumption in litres per person per day) and the individual and collective performance of the water supply systems. WUE indicates how effective is water used by consumers, i.e. the process between effective water use and actual water abstraction. This concept is closely related to the Department's No Drop Certification assessment, whereby WUE, NRW and water losses are targeted as part of Water Conservation and Water Demand Management strategies by municipalities.

Findings: Both the Blue Drop audit and No Drop audits require an IWA water balance to determine the SIV into each water supply system, and to identify and quantify possible losses from abstraction to the end-of-use point. Bloem Water now Vaal Central Water, Kopanong LM and Mangaung MM (15 WSSs) and a few random systems in 3 other WSAs (3 WSSs) have full water balances in place for 18 WSSs in total. 26 WSSs in 6 WSAs have partial water balances in place, and 10 WSAs with a total of 36 WSSs do not have water balances in place.

WUE considers the SIV contributions, population served, and the average daily consumption, as summarised in the following table.

Table 14 - Summary of total SIV, total population served, average daily consumption, WUE status and performance trend

WSA Name	# WSSs	Total Population	Total SIV (kl/d)	2023 WUE (l/p/d)	2023 Blue Drop WUE Range and Performance	
Dihlabeng LM	3	122,908	31,867	259	>250-300	Poor
Kopanong LM	8	71,000	8,628	122	<150	Excellent
Letsemeng LM	5	35,690	9,782	274	>250-300	Poor
Mafube LM	3	62,794	21,400	341	>300	Extremely High
Maluti-a-Phofung LM	8	361,086	76,443	212	>200-250	Average
Mangaung	7	1,041,632	211,076	203	>200-250	Average
Mantsopa LM	5	51,691	10,913	211	>200-250	Average
Masilonyana LM	4	91,134	10,650	117	<150	Excellent
Matjhabeng LM	6	365,578	194,127	531	>300	Extremely High
Metsimaholo LM	3	149,287	49,071	329	>300	Extremely High
Mohokare LM	3	38,000	6,296	166	>150-200	Good
Moqhaka LM	3	138,354	38,904	281	>250-300	Poor
Nala LM*	1	104,594	14,631	140	<150	Excellent
Ngwathe LM	5	112,362	30,988	276	>250-300	Poor
Nketoana LM	4	76,756	14,700	192	>150-200	Good
Phumelela LM	3	29,694	13,000	438	>300	Extremely High
Setsoto LM	4	99,895	26,360	264	>250-300	Poor
Tokologo LM	3	28,986	9,894	341	>300	Extremely High
Tswelopele LM	2	47,300	12,913	273	>250-300	Poor
Totals	**80**	**3,028,741**	**791,643**	**261**		

WUE (l/cap/day) performance categories

Colour	WUE Range	Performance
	>300	Extremely high per capita water use
	>250-300	Poor per capita water use
	>200-250	Average per capita water use with potential for marked improvement
	>150-200	Good per capita water use but some improvement may be possible subject to economic benefits
	<150	Excellent per capita water use management

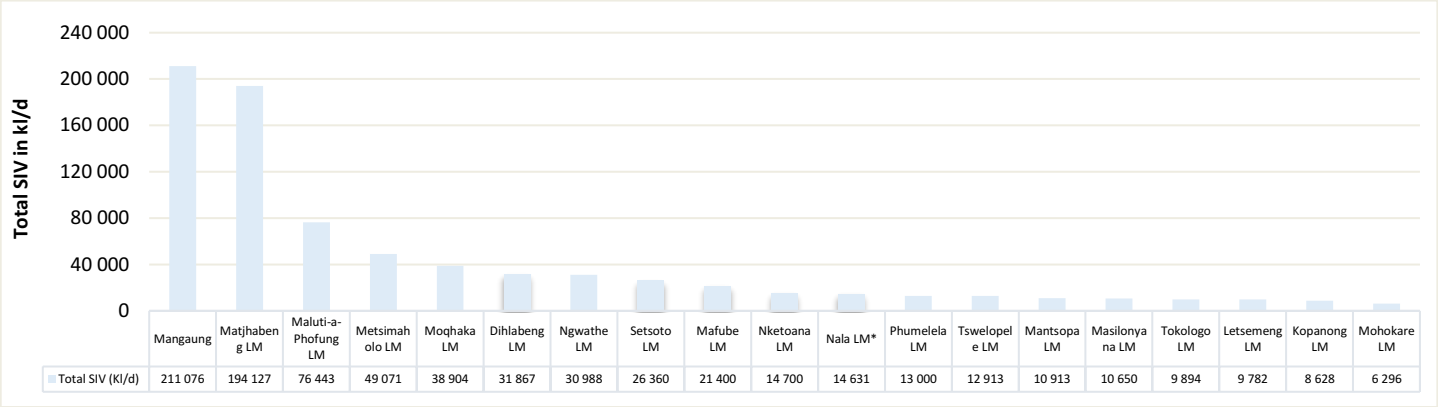


Figure 15 - Total SIV towards the WSSs

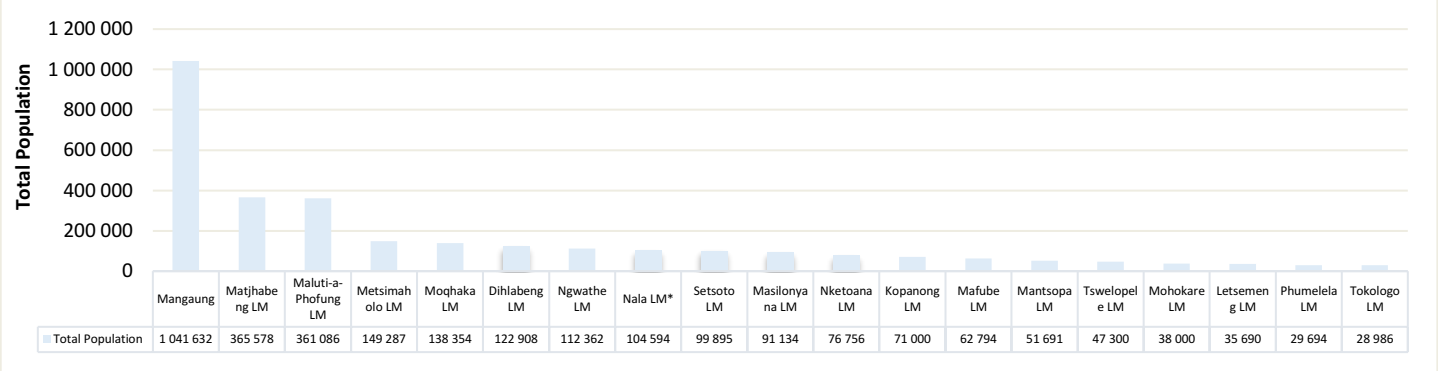


Figure 16 - Total Population served

For the province, 791,643 kl/d water is supplied to 3,028,741 consumers. Comparatively, Mangaung and Matjhabeng LM distribute 28% of the total provincial SIV, followed by Maluti-a-Phofung LM (10%) and Metsimaholo LM (6%). An average 261 litres of water is used per person per day, which implies a very high (poor) per capita water use. Results from the diagnostic data show that the 5 WSAs have WUEs of more than 300 l/c/d, which is regarded as extremely high according to national benchmarks. 6 WSAs have WUEs between 250–300 l/c/d, which is regarded as poor. No Drop Certification programme seeks to curb water losses and improve NRW through water accounting assessments and water conservation and demand management.

Diagnostic 3: Drinking Water Quality (DWQ) Monitoring and Compliance

Aim: Blue Drop audits values the principles of "To measure is to know" and "To know is to manage". The primary objective of a water treatment plant is to produce final water quality that is safe for human consumption at the end of the distribution network. This standard can only be measured and achieved if operational and compliance monitoring and DWQ compliance is executed at the correct frequency, sample point, and determinand type. This diagnostic assesses the i) operational and compliance monitoring status, ii) drinking water quality compliance, and iii) risk defined compliance and laboratory credibility.

(i) Drinking water operational and compliance monitoring

Findings: A minimum level of 90% operational monitoring compliance is applied as benchmark, to give weight to the importance of sampling and monitoring of the raw water, process unit water, and final water across the treatment stream. Compliance monitoring is also informed by SANS 241:2015 and the requirement for risk-informed monitoring through the WaSP process at both the WTW final and distribution network. DWQ compliance is calculated against the population size and the mandatory limits set by SANS 241:2015 and the Blue Drop standards, as calculated and reported from data loaded in the IRIS.

Table 15 - Summary of the KPA 2 WTW operational and WSS compliance monitoring status

WSA & WB Name	# WTWs	# WSSs	WTW Operational monitoring [KPA 2 sub-KPA 2.b)]		WSS Compliance monitoring [KPA 2 sub-KPA 2.c)]	
			Satisfactory [BD score ≥90%]	Not Satisfactory [BD score <90%]	Satisfactory [BD score ≥90%]	Not Satisfactory [BD score <90%]
Bloem Water now Vaal Central Water	7	11	5	2		11

WSA & WB Name	# WTWs	# WSSs	WTW Operational monitoring [KPA 2 sub-KPA 2.b)]		WSS Compliance monitoring [KPA 2 sub-KPA 2.c)]	
			Satisfactory [BD score ≥90%]	Not Satisfactory [BD score <90%]	Satisfactory [BD score ≥90%]	Not Satisfactory [BD score <90%]
Bloem Water now Vaal Central Water (Sedibeng Water)	2	7	1	1		7
Dihlabeng LM	3	3	3	0		3
Kopanong LM	6	8	0	6		8
Letsemeng LM	5	5	3	2		5
Mafube LM	3	3	0	3		3
Maluti-a-Phofung LM	4	8	3	1		8
Mangaung	7	7	3	4		7
Mantsopa LM	4	5	0	4		5
Masilonyana LM	4	4	0	4		4
Matjhabeng LM	None	6				6
Metsimaholo LM	2	3	0	2	1	2
Mohokare LM	3	3	0	3		3
Moqhaka LM	3	3	0	3		3
Nala LM*	None	1				1
Ngwathe LM	4	5	0	4	1	4
Nketoana LM	4	4	2	2		4
Phumelela LM	4	3	3	1		3
Setsoto LM	4	4	0	4		4
Tokologo LM	4	3	1	3		3
Tswelopele LM	2	2	2	0		2
Totals	**75**	**80**	**26 (35%)**	**49 (65%)**	**2 (3%)**	**78 (97%)**

The performance recorded in the table above stems from performance data as measured against the Blue Drop Standard expressed in KPA 2 and sub-KPAs 2.b) and 2.c). Overall, an unsatisfactory sampling and analysis regime is observed for both operational (65%) and compliance (97%) monitoring.

The data indicates that 26 of 75 WTWs (35%) are on par with good practice for operational monitoring of the raw and final water and the respective process units at the WTW. Dihlabeng and Tswelopele are doing exceptionally well, whilst the remaining WSAs fail in varying degrees to meet the Blue Drop standard. In terms of compliance monitoring, only 2 WSSs (3%) are on par with good compliance monitoring practices, and 78 WSSs (97%) are failing the Blue Drop standard.

The latter observation is noted with deepening concern. Compliance monitoring is a legal requirement and the only means to measure the DWQ performance of a water supply system. Operational monitoring is the cornerstone of day-to-day process adjustments and optimisation to ensure that the water treatment is efficient and delivers quality final water. The results indicate that 49 WTWs and 78 WSSs are not achieving regulatory and industry standards.

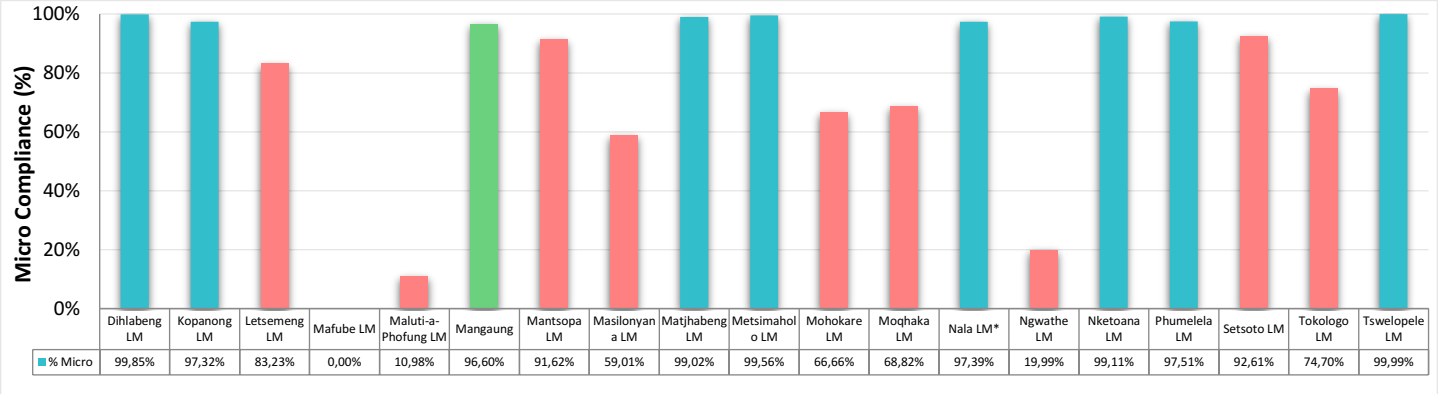
(ii) Drinking water quality compliance

Findings: DWQ compliance is measured against the requirements of SANS 241:2015 under KPA 5 of the Blue Drop audit. The tables following summarises the results of the DWQ status for Microbiological and Chemical Compliance, which also carries the highest Blue Drop score weighting of 35%.

Table 16 - Provincial Summary of the DWQ Status for Microbiological Compliance

WSA Name	# WSSs	Population	% Ave. Micro Compliance	# WSS Micro Performance Status		
				Excellent	Good	Unacceptable
Dihlabeng LM	3	122,908	99.85%	3		
Kopanong LM	8	71,000	97.32%	5	1	2
Letsemeng LM	5	35,690	83.23%			5
Mafube LM	3	62,794	0.00%			3
Maluti-a-Phofung LM	8	361,086	10.98%			8
Mangaung	7	1,041,632	96.60%	2	1	4
Mantsopa LM	5	51,691	91.62%	2		3
Masilonyana LM	4	91,134	59.01%			4
Matjhabeng LM	6	365,578	99.02%	6		
Metsimaholo LM	3	149,287	99.56%	3		
Mohokare LM	3	38,000	66.66%			3
Moqhaka LM	3	138,354	68.82%			3

WSA Name	# WSSs	Population	% Ave. Micro Compliance	# WSS Micro Performance Status		
				Excellent	Good	Unacceptable
Nala LM*	1	104,594	97.39%			1
Ngwathe LM	5	112,362	19.99%	1		4
Nketoana LM	4	76,756	99.11%	3	1	
Phumelela LM	3	29,694	97.51%	2		1
Setsoto LM	4	99,895	92.61%	2		2
Tokologo LM	3	28,986	74.70%	1		2
Tswelopele LM	2	47,300	99.99%	2		
Totals	**80**	**3,028,741**	**76.52%**	**32**	**3**	**45**



MICRO: Population <100,000		
Colour	Status	Percentage
	Excellent	≥97%
	Good	≥96 - <97%
	Unacceptable	<96%

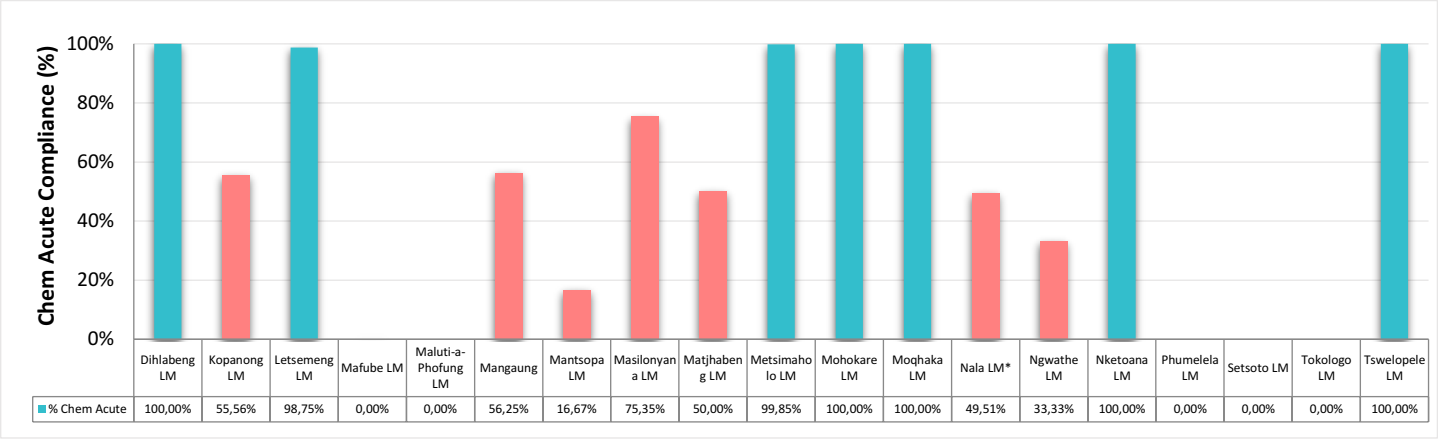
MICRO: Population >100,000		
Colour	Status	Percentage
	Excellent	≥99%
	Good	≥98 - <99%
	Unacceptable	<98%

Figure 17 - Provincial Microbiological Drinking Water Quality Status

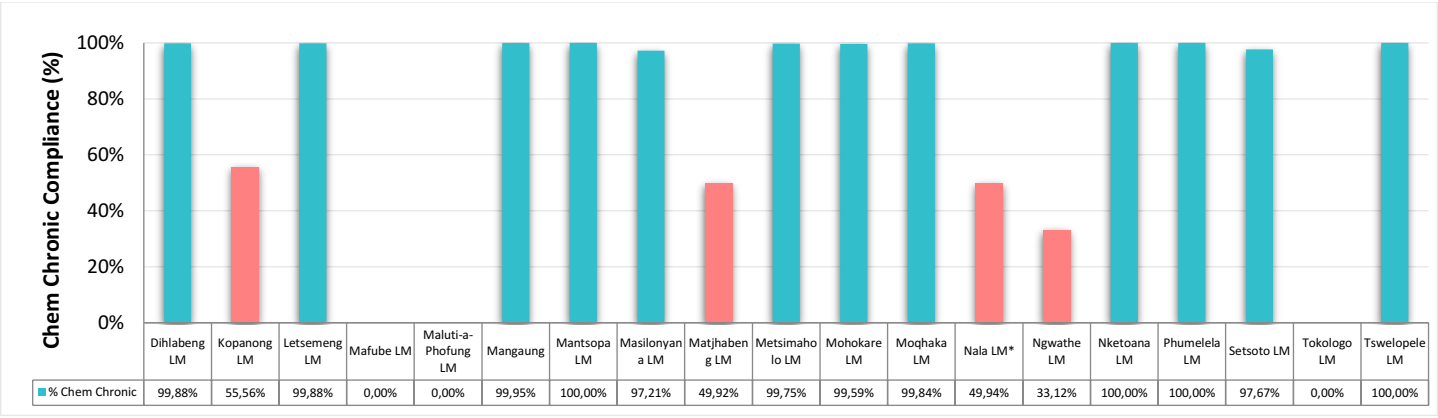
Out of the 80 WSSs, 32 (40%) systems achieved excellent microbiological quality whilst 45 (56%) systems have an unacceptable microbiological water quality status. The water in these systems pose a serious acute health risk to the community. Failure to produce water that meets microbiological compliance standards can be linked back to poor operations, defective infrastructure, inadequate dosing rates, absence of disinfection chemicals, lack of monitoring, lack of operating and chemistry knowledge, and several other root causes. WSIs that are not monitoring the final water quality at the outlet of the treatment plant or at specific end use points are required to develop a monitoring programme and resume with compliance monitoring as a matter of urgency.

Table 17 - Provincial Summary of the DWQ Status for Chemical Acute Health and Chronic Health Compliance

WSA Name	# WSSs	Population	% Ave. Chem Acute Health Compliance	# WSS Chem Acute Health Performance Status			% Ave. Chem Chronic Health Compliance	# WSS Chem Chronic Health Performance Status		
				Excellent	Good	Unacceptable		Excellent	Good	Unacceptable
Dihlabeng LM	3	122,908	100.0%	3			99.9%	3		
Kopanong LM	8	71,000	55.6%			8	55.6%			8
Letsemeng LM	5	35,690	98.8%	4		1	99.9%	5		
Mafube LM	3	62,794	0.0%			3	0.0%			3
Maluti-a-Phofung LM	8	361,086	0.0%			8	0.0%			8
Mangaung	7	1,041,632	56.3%	1		6	100.0%	7		
Mantsopa LM	5	51,691	16.7%			5	100.0%	5		
Masilonyana LM	4	91,134	75.3%	2		2	97.2%	3		1
Matjhabeng LM	6	365,578	50.0%			6	49.9%			6
Metsimaholo LM	3	149,287	99.8%	3			99.8%	3		
Mohokare LM	3	38,000	100.0%	3			99.6%	3		
Moqhaka LM	3	138,354	100.0%	3			99.8%	3		
Nala LM*	1	104,594	49.5%			1	49.9%			1
Ngwathe LM	5	112,362	33.3%	1		4	33.1%	1		4
Nketoana LM	4	76,756	100.0%	4			100.0%	4		
Phumelela LM	3	29,694	0.0%			3	100.0%	3		
Setsoto LM	4	99,895	0.0%			4	97.7%	4		
Tokologo LM	3	28,986	0.0%			3	0.0%			3
Tswelopele LM	2	47,300	100.0%	2			100.0%	2		
Totals	**80**	**3,028,741**	**54.5%**	**26**	**0**	**54**	**72.8%**	**46**	**0**	**34**



CHEM Acute Health: Population <100,000			CHEM Acute Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	≥97%		Excellent	≥99%
	Good	≥95 - <97%		Good	≥97 - <99%
	Unacceptable	<95%		Unacceptable	<97%



CHEM Chronic Health: Population <100,000			CHEM Chronic Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	≥95%		Excellent	≥97%
	Good	≥93 - <95%		Good	≥95 - <97%
	Unacceptable	<93%		Unacceptable	<95%

Figure 18 - Provincial Chemical Acute Health and Chronic Health Drinking Water Quality Status

Chemical acute health compliance shows that 26 (33%) systems have excellent, and no systems have good water quality, whilst 54 (67%) systems in 13 WSAs have an unacceptable chemical acute health compliance. Chemical chronic health compliance shows that 46 (58%) systems have excellent, and no systems have good water quality, whilst 34 (42%) systems in 8 WSAs have an unacceptable chemical chronic health compliance.

The Water Services Act upholds standards regarding the monitoring and reporting on drinking water quality and issuance of advisory notices to the public when significant DWQ failures are observed. The audit process applies a penalty when DWQ failures are noticed without issuing such Water Quality Alert Notices to forewarn consumers of the status of (unsafe) water quality and to advise communities to source alternative water sources or methods to disinfect water used for drinking water purposes.

The following table reflects the compliance status of the WSAs as regards the issuing of these notices for DWQ failures.

Table 18 - Summary of Penalties Applied to WSSs for not Issuing Advisory Notices

WSA Name	# WSS	# WSS No Penalty Applied	# WSS Partial Penalty Applied	WSS Names Partial Penalty	# WSS Full Penalty Applied	WSS Names Full Penalty
Dihlabeng LM	3	3				
Kopanong LM	8	3	2	Philippolis, Springfontein	3	Bethulie, Jagersfontein, Trompsburg
Letsemeng LM	5	3	2	Jacobsdal, Koffiefontein		
Mafube LM	3				3	Frankfort, Tweeling, Villiers
Maluti-a-Phofung LM	8				8	All 8 Systems
Mangaung	7	3			4	Botshabelo, Vanstadensrus, Soutpan, Thaba Nchu

WSA Name	# WSS	# WSS No Penalty Applied	# WSS Partial Penalty Applied	WSS Names Partial Penalty	# WSS Full Penalty Applied	WSS Names Full Penalty
Mantsopa LM	5	1	1	Ladybrand	3	Excelsior, Hobhouse, Tweespruit
Masilonyana LM	4				4	All 4 Systems
Matjhabeng LM	6		6	All 6 Systems		
Metsimaholo LM	3	3				
Mohokare LM	3				3	All 3 Systems
Moqhaka LM	3		3	All 3 Systems		
Nala LM*	1		1	Balkfontein		
Ngwathe LM	5		1	Heilbron	4	Koppies, Parys, Edenville, Vredefort
Nketoana LM	4	4				
Phumelela LM	3	2	1	Warden		
Setsoto LM	4	2	2	Clocolan, Senekal		
Tokologo LM	3		3	All 3 Systems		
Tswelopele LM	2	2				
Totals	**80**	**26**	**22**		**32**	

No penalties were applied to 26 (33%) WSSs, partial penalties were applied to 22 (27%) WSSs, and full penalties were applied to 32 (40%) WSSs. The names of the WSSs that received partial or full penalties are reflected in the table above.

(iii) Risk defined compliance and laboratory credibility

***Findings*:** Risk-defined compliance standards aim to determine the compliance (to SANS 241) of those parameters that have been found to pose a risk in a specific WSS and need to be included in the routine monitoring programme or frequency as prescribed by SANS 241. The province achieved an average Annual Risk Defined Compliance of 71.7%, with the best performances coming from Kopanong LM and Tswelopele LM and the worst performances coming from Maluti-a-Phofung LM, Matjhabeng LM and Mantsopa LM. Excellent risk defined compliance was achieved by 15 (19%) systems, good compliance for 10 (13%) systems and bad compliance for 55 (68%) systems.

Table 19 - Summary of the DWQ Compliance for Risk Defined Compliance

WSA Name	# WSSs	Population	Ave. % Risk Defined Compliance	# WSS Performance Status		
					Good	Bad
Dihlabeng LM	3	122,908	95.60%	1	2	
Kopanong LM	8	71,000	97.48%	6	2	
Letsemeng LM	5	35,690	88.50%	1		4
Mafube LM	3	62,794	0.00%			3
Maluti-a-Phofung LM	8	361,086	9.87%			8
Mangaung	7	1,041,632	87.79%		3	4
Mantsopa LM	5	51,691	69.78%			5
Masilonyana LM	4	91,134	58.89%			4
Matjhabeng LM	6	365,578	58.94%			6
Metsimaholo LM	3	149,287	92.57%	1	1	1
Mohokare LM	3	38,000	66.66%			3
Moqhaka LM	3	138,354	77.46%			3
Nala LM*	1	104,594	96.87%		1	
Ngwathe LM	5	112,362	19.77%	1		4
Nketoana LM	4	76,756	92.57%	1	1	2
Phumelela LM	3	29,694	92.14%	1		2
Setsoto LM	4	99,895	83.40%			4
Tokologo LM	3	28,986	74.70%	1		2
Tswelopele LM	2	47,300	99.00%	2		
Totals	**80**	**3,028,741**	**71.68%**	**15**	**10**	**55**

The aim of operational determinand compliance is to determine the efficiency of the water treatment process, by monitoring those parameters which are used to control the treatment process. Although not necessarily a health risk, these parameters provide good information on the integrity of the WTW. The province achieved an average % Actual Operational Determinand Compliance of 43%, the best performance coming from Tswelopele LM only, and the worst performance coming from Kopanong LM. Excellent risk defined compliance was achieved by 15 (20%) systems, good compliance for none of the systems and bad compliance for 60 (80%) systems.

Table 20 - Summary of the Treatment (Operational) Efficiency Index

WSA & WB Name	# WTWs	Population	Ave. % Actual Operational Determinand Compliance	# WTW Performance Status		
				Excellent	Good	Bad
Bloem Water now Vaal Central Water	7	1,112,095	75%	5		2
Bloem Water now Vaal Central Water (Sedibeng Water)	2	470,172	93%	1		1
Dihlabeng LM	3	122,908	64%	1		2
Kopanong LM	6	71,000	45%	2		4
Letsemeng LM	5	35,690	0%			5
Mafube LM	3	62,794	13%			3
Maluti-a-Phofung LM	4	361,086	80%	2		2
Mangaung	7	1,041,632	24%	2		5
Mantsopa LM	4	51,691	0%			4
Masilonyana LM	4	91,134	13%			4
Matjhabeng LM	None	365,578				
Metsimaholo LM	2	149,287	50%			2
Mohokare LM	3	38,000	22%			3
Moqhaka LM	3	138,354	0%			3
Nala LM*	None	104594				
Ngwathe LM	4	112,362	33%			4
Nketoana LM	4	76,756	78%			4
Phumelela LM	4	29,694	68%			4
Setsoto LM	4	99,895	56%			4
Tokologo LM	4	28,986	0%			4
Tswelopele LM	2	47,300	99%	2		
Totals	**75**	**3,028,741**	**43%**	**15**	**0**	**60**

The data further confirms that 15 WSAs in the province have access to credible laboratories for compliance and operational analysis. These in-house or contracted laboratories are accredited with SANAS or have Proficiency Testing Schemes with SABS or have inter-laboratory quality checks in place to ensure that suitable analytical methods are applied and that quality assurance processes are followed to ensure credible water quality results. The province is predominantly meeting the regulatory expectation for the WSIs having access to credible analytical services for compliance and operational monitoring.

Diagnostic 4: Technical Site Assessments

Aim: The Blue Drop process makes provision for a Technical Site Assessment (TSA) in order to verify the desktop evidence through field-based inspections. This assessment includes a physical inspection of the entire water treatment plant with all its process units, as well as the reservoir and spot checks of a pumpstation and pipelines. The technical assessment is coupled with an asset condition check to determine an approximate cost (VROOM) to restore existing infrastructure to functional status for the treatment facility (only).

Findings: The results of the province's TSAs are summarised in the table below. A deviation of 10% between the BD and TSA score indicate a misalignment between the administrative aspects and the work on the ground. The Regulator regards a WTW with a TSA score of >80% to have an acceptable level of process control and functional equipment, and a TSA score of 90% as an excellent system that complies with most of the Blue Drop TSA standards. A TSA score of <30% indicates that the treatment facility and network fails in most regards, and is evident of dysfunctional infrastructure, failed process control, absence of record keeping and monitoring, and poor water quality.

The VROOM cost presents a ''Very Rough Order of Measurement" cost to return a WTWs functionality to its original design. More detail can be found in the Blue Drop Watch Report 2023.

Table 21 - %TSA and %BD score, and VROOM cost estimates total and split for civil, mechanical, and electrical

WSA & WB Name	TSA Name	%TSA	2023 BD Score (%)	Civil cost estimate	Mechanical cost estimate	Electrical & C&I cost estimate	Total VROOM cost
Bloem Water now Vaal Central Water	Welbedacht	72.0%	**62.8%**	9,062,500	21,750,000	5,437,500	36,250,000
Bloem Water now Vaal Central Water (Sedibeng Water)	Virginia	88.0%	**55.6%**	30,000,000	72,000,000	18,000,000	120,000,000
Bloem Water now Vaal Central Water (Sedibeng Water)	Balkfontein	82.0%	**52.3%**	11,520,000	69,120,000	34,560,000	115,200,000
Dihlabeng LM	Fouriesburg	68.0%	**76.6%**	2,146,297	613,228	306,614	3,066,139
Dihlabeng LM	Clarens	68.0%	**76.6%**	82,940	622,050	124,410	829,400

WSA & WB Name	TSA Name	%TSA	2023 BD Score (%)	Civil cost estimate	Mechanical cost estimate	Electrical & C&I cost estimate	Total VROOM cost
Kopanong LM	Bethulie	95.0%	**57.9%**	192,000	0	0	192,000
Letsemeng LM	Jacobsdal	81.0%	**32.9%**	1,249,600	156,200	156,200	1,562,000
Mafube LM	Frankfort	44.0%	**4.3%**	3,276,000	1,260,000	504,000	5,040,000
Maluti-a-Phofung LM	Wilge-Harrismith	67.0%	**17.7%**	1,520,639	1,520,639	337,920	3,379,197
Mangaung MM	Maselspoort	62.0%	**62.8%**	62,335,000	19,180,000	14,385,000	95,900,000
Mantsopa LM	Genoa	36.0%	**42.3%**	8,969,400	4,892,400	2,446,200	16,308,000
Masilonyana LM	Winburg	31.0%	**25.5%**	5,715,600	2,598,000	2,078,400	10,392,000
Metsimaholo LM	Deneysville	73.0%	**84.2%**	121,220	424,268	60,610	606,098
Mohokare LM	Zastron	40.0%	**27.6%**	2,993,760	1,905,120	544,320	5,443,200
Moqhaka LM	Vijoenskroon	62.0%	**36.1%**	2,691,000	2,421,900	269,100	5,382,000
Ngwathe LM	Parys	36.0%	**36.2%**	8,279,975	21,527,935	3,311,990	33,119,900
Nketoana LM	Reitz	28.0%	**45.6%**	23,625,000	30,375,000	13,500,000	67,500,000
Phumelela LM	Vrede	55.0%	**41.3%**	399,000	665,000	266,000	1,330,000
Setsoto LM	Ficksburg	81.0%	**43.3%**	2,672,342	5,344,685	890,781	8,907,808
Tokologo LM	Hertzogville	75.0%	**24.8%**	63,000	409,500	157,500	630,000
Tswelopele LM	Hoopstad	82.0%	**73.8%**	976,800	122,100	122,100	1,221,000
			Totals	**R177,892,073**	**R256,908,025**	**R97,458,645**	**R532,258,741**
			% Split of Cost Items	**34%**	**48%**	**18%**	**100%**

A deviation of >10% between the BD and TSA score is noted for 14 of the 21 WTWs assessed, whilst a deviation of >20% between the BD and TSA score is noted for 9 of the 21 WTWs assessed. For the individual WTWs assessed in the province, a total budget of R532.3m is estimated, with the bulk of the work (82%) going towards restoration of mechanical equipment (34%) and civil infrastructure (48%).

Diagnostic 5: Operation, Maintenance and Refurbishment of Assets

Aim: Insufficient financial resources are often cited as a root cause to dysfunctional or non-compliant water treatment works and water networks. Knowledge and monitoring of fiscal spending are therefore a critical part of water services management and municipal governance of public assets. This diagnostic investigates the status of financial information as pertaining to O&M budgets and expenditure, asset figures, and capital funding.

Findings: A substantial amount of financial information was presented during the audit process. Unfortunately, the evidence was presented in different formats, levels of detail, or absent for some WSAs. It was observed that WSA teams with financial officials that were present during the audits performed better and had a better understanding of the water services challenges experienced by their technical peers.

Discrepancies observed included amongst others - generic or non-ringfenced budgets, contract lump sums for service providers presented as budgets, outdated or incomplete asset registers, and some cost drivers which were lacking. As data credibility presents a significant challenge, the Regulator grouped data into different certainty levels, as summarised at the end of this Diagnostic.

The result of each financial portfolio is discussed hereunder.

NOTE: The Regulator regards the financial and asset information with low confidence. Not all WSAs submitted verifiable information or complete financial data sets for the audit year in question.

Capital, O&M Budget and Actual, and Asset Value

The capital budgets, O&M budgets, O&M actual expenditure, and current asset values are summarised below.

Table 22 - Summary of the capital budgets, O&M budgets, O&M actual expenditure, and current asset values

WSA & WB Name	Capital budget available (R)	O&M budget (R) (2021/22)	O&M expended (R) (2021/22)	% Expended	Total Current Asset Value (R)
Bloem Water now Vaal Central Water	NI	R269,165,411	R222,308,651	83%	R611,114,290
Bloem Water now Vaal Central Water (Sedibeng Water)	NI	R78,831	R61,702	78%	R3,004,315,995
Dihlabeng LM	R17,405,092	R48,937,947	R46,740,423	96%	R533,215,000
Kopanong LM	R65,000,000	R86,516,134	R63,038,716	73%	R212,964,733
Letsemeng LM	NI	NI	NI	NI	NI
Mafube LM	NI	NI	NI	NI	NI

WSA & WB Name	Capital budget available (R)	O&M budget (R) (2021/22)	O&M expended (R) (2021/22)	% Expended	Total Current Asset Value (R)
Maluti-a-Phofung LM	NI	NI	NI	NI	NI
Mangaung	R544,000,000	R115,388,996	R166,002,001	144%	R1,304,529,200
Mantsopa LM	R150,557,499	R19,955,993	R18,701,592	94%	R176,658,657
Masilonyana LM	NI	R63,346,637	R29,529,317	47%	R294,895,699
Matjhabeng LM	R68,000,000	R1,371,408,049	R1,974,278,094	144%	R1,035,973,434
Metsimaholo LM	R19,142,000	NI	NI	NI	R87,850,021
Mohokare LM	R250,100,000	R24,356,671	R24,585,642	101%	R30,041,726
Moqhaka LM	NI	NI	NI	NI	NI
Nala LM*	NI	NI	NI	NI	NI
Ngwathe LM	NI	R30,987,450	R15,161,744	49%	R112,496,829
Nketoana LM	NI	R329,880,178	R323,390,638	98%	R640,351,705
Phumelela LM	NI	R7,116,445	NI	NI	R354,278,032
Setsoto LM	R129,369,001	NI	NI	NI	NI
Tokologo LM	R959,991	R98,519,000	R98,519,000	100%	NI
Tswelopele LM	R58,736,154	R18,892,560	R23,839,135	126%	NI
Totals	**R1,303,269,737**	**R2,484,550,302**	**R3,006,156,655**	**121.0%**	**R8,398,685,321**

The Regulatory Comments following in this Chapter list the capital projects with secured funding for each municipality and/or its bulk water provider. The capital lists are deemed to be a definitive means to address water service inadequacies and ensuring water infrastructure investment. A total capital budget of R1.3b has been reported for the refurbishment and upgrades of water supply system infrastructure for most of the WSAs. The largest capital budgets are observed for Mangaung MM (R544m), Mohokare LM (R250.1m) and Mantsopa LM (R150.6).

For the 2021/22 fiscal year, the total O&M budget reported for the province was R2,485b, of which R3,006b (121%) has been expended. Over-expenditure of 144% by Matjhabeng LM and Mangaung MM respectively and 126% by Tswelopele LM, and under expenditure by Masilonyana LM (47%) and Ngwathe LM (49%) was observed. The provincial figures exclude 9 of the 19 WSAs who had no and partial financial information.

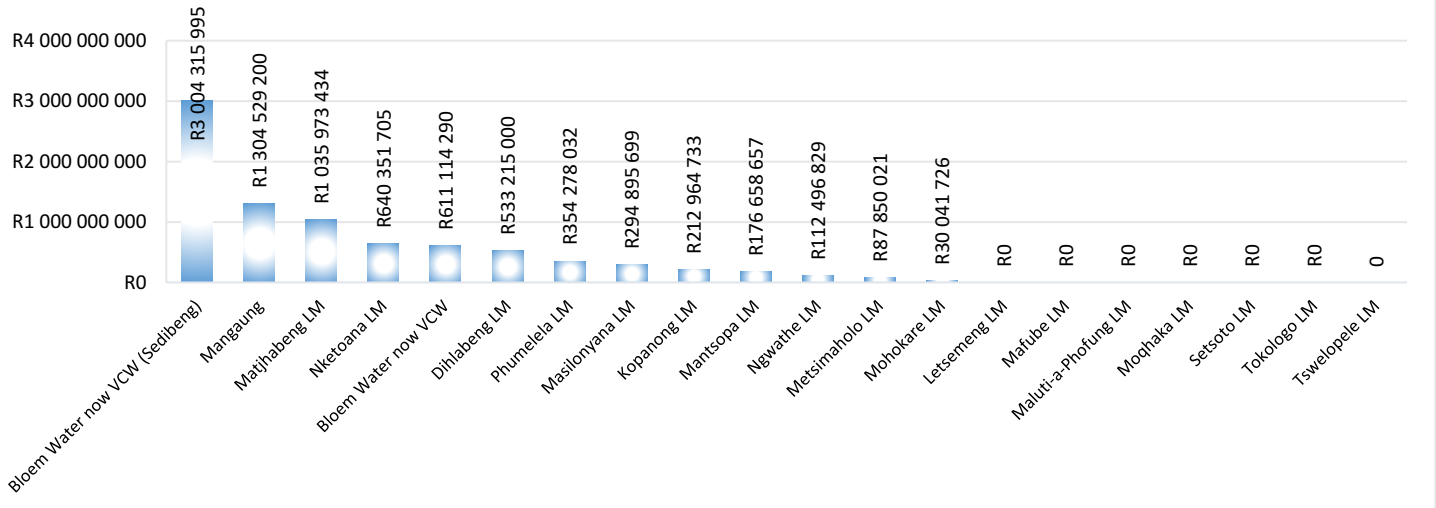


Figure 19 - Total current asset value reported

The total current asset value for water infrastructure (networks, pump stations, treatment plants) is reportedly R8.4b (excluding 7 WSAs with no asset value information). The highest asset values are observed for Bloem Water now Vaal Central Water (Sedibeng Water) (R3.0b), followed by Mangaung MM (R1.3b), Matjhabeng LM (R1.04b), Nketoana LM (R640m) and Dihlabeng LM (R533m).

O&M Cost Benchmarking

By combining the SALGA and WRC WATCOST models, an estimation of the maintenance cost required per asset type can be done, i.e. civil, buildings, pipelines, mechanical, electrical, and instrumentation.

Table 23 - SALGA-WRC annual maintenance budget guideline and cost estimation

Description	% of Current Asset Value	Asset Value Estimate	Modified SALGA Maintenance Guideline	Annual Maintenance Budget Guideline
Current Asset Value estimate	**100%**	**R8,398,685,321**	**15.75%**	**R181,411,603**
Broken down into:				
1. Civil Structures	46%	R3,863,395,248	0.50%	R19,316,976
2. Buildings	3%	R251,960,560	1.50%	R3,779,408
3. Pipelines	6%	R503,921,119	0.75%	R3,779,408
4. Mechanical Equipment	30%	R2,519,605,596	4.00%	R100,784,224
5. Electrical Equipment	11%	R923,855,385	4.00%	R36,954,215
6. Instrumentation	4%	R335,947,413	5.00%	R16,797,371
Totals	**100%**	**R8,398,685,321**	**15.75%**	**R181,411,603**
			Minus 20% P&Gs and 10% Installation	**R54,423,481**
			Total	**R126,988,122**

The model estimates that R181.4m (2.16%) is required per year to maintain the assets valued at about R8.4b. Notably, this maintenance estimate assumes that all assets are functional. In cases where Blue Drop Certification is not being achieved, it can be assumed that some form of inefficiency or constraint is being experienced, and national benchmarks closer to 7% of the asset value is advocated (R587.9m).

The table below indicates the SALGA maintenance cost estimation in relation to the O&M budget, and O&M actual expended.

Table 24 - O&M cost estimates by the SALGA versus actual budget and expenditure figures

Cost Reference	O&M Cost Estimate	Period	% of Asset Value
Modified SALGA	R181,411,603	Annually, estimation	2.16%
O&M Budget	R2,484,550,302	Actual for 2021/22	29.5%
O&M Spend	R3,006,156,655	Actual for 2021/22	35.8%

In addition, the table below indicates the Blue Drop audit findings on the water supply operations cost determination and water supply O&M budget status.

Table 25 - BD Audit Water Supply Operations Cost Determination and Water Supply O&M Budget status

WSA & WB Name	Water Supply Operations Cost Determination	Water Supply O&M Budget status
Bloem Water now Vaal Central Water	NOT SYSTEM SPECIFIC (GLOBAL), DETERMINED FOR PART OF SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Bloem Water now Vaal Central Water (Sedibeng Water)	NOT SYSTEM SPECIFIC (GLOBAL), DETERMINED FOR PART OF SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Dihlabeng LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Kopanong LM	NOT SYSTEM SPECIFIC (GLOBAL), DETERMINED FOR PART OF SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Letsemeng LM	NOT SYSTEM SPECIFIC (GLOBAL)	BUDGET IS NOT RINGFENCED FOR WATER ONLY
Mafube LM	NO PROOF (0% SCORE)	NO PROOF
Maluti-a-Phofung LM	NOT SYSTEM SPECIFIC (GLOBAL)	BUDGET IS NOT RINGFENCED FOR WATER ONLY
Mangaung	DETERMINED FOR PART OF SYSTEM, NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Mantsopa LM	DETERMINED FOR PART OF SYSTEM, NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Masilonyana LM	NOT SYSTEM SPECIFIC (GLOBAL)	BUDGET IS NOT RINGFENCED FOR WATER ONLY
Matjhabeng LM	DETERMINED FOR PART OF SYSTEM, NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Metsimaholo LM	NOT SYSTEM SPECIFIC (GLOBAL), DETERMINED OF THE WHOLE SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY, SYSTEM SPECIFIC BUDGET (RAND WATER)
Mohokare LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Moqhaka LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Nala LM*	DETERMINED FOR PART OF SYSTEM, NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Ngwathe LM	DETERMINED FOR PART OF SYSTEM, NOT SYSTEM SPECIFIC (GLOBAL), DETERMINED OF THE WHOLE SYSTEM (RAND WATER)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY, SYSTEM SPECIFIC BUDGET (RAND WATER)
Nketoana LM	NOT SYSTEM SPECIFIC (GLOBAL)	SYSTEM SPECIFIC BUT INCLUDES WATER & SANITATION
Phumelela LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY

WSA & WB Name	Water Supply Operations Cost Determination	Water Supply O&M Budget status
Setsoto LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Tokologo LM	NO PROOF (0% SCORE)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Tswelopele LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY

From the tables above, the cost dynamics can be summarised as follows:

- The SALGA estimations for maintenance budgets is about 7.3% (Modified SALGA divided by O&M Budget) of the actual reported budgets for the 2021/22 fiscal year
- The actual O&M budget (29.5%) appears to be more than adequate when compared with the SALGA guideline (2.16%) or with the government benchmark (7%)
- These figures may be impacted by some of the smaller WSAs who did not provide budget and expenditure figures, and by some inaccurate asset values and where no asset values were provided for
- Lastly, the municipalities presents budget and expenditure data at different levels (table above) i.e. financial figures are not always ringfenced per water supply system – thus rendering provincial summaries to be indicative.

4.1 Bloem Water (Now Central Vaal Water)

Introduction

Bloem Water is a Water Board that extends operations to the Free State and Northern Cape areas after incorporation of former Sedibeng Water in August 2022.

It's customer base includes the following Municipalities: Mangaung Metropolitan, Mantsopa, Kopanong, Matjhabeng, Nala, Nama Khoi, Khai-Ma, Dikgatlong, Tsantsabane, Joe Morolong, Phokwane, Gamagara and Ga-Segonyana Local Municipalities, a total of twenty-six (26) Mines in the Free State and Northern Cape Provinces, Six (6) solar generation plants in the Northern Cape, Kalahari East Water Users Association in the Northern Cape and other stakeholders that cannot be serviced by Municipalities within the area of service for the Entity.

Bloem Water executes its operation through the twelve (12) schemes on behalf of DWS with the following treatment works located in Free State and Northern Cape.

Province	Region	WTW	Municipalities served as per BD audits
Free State	Former Sedibeng	Balkfontein – Bothaville and Virginia	Matjhabeng LM and Nala LM
	Caledon River Region	Welbedacht	Mangaung MM, Kopanong LM, Mantsopa LM (Excelsior system)
	Orange River Region	Bethulie; Gariep, Philippolis and Jagersfontein	Kopanong LM
	Modder River Region	Rustfontein and Groothoek	Mangaung MM
Northern Cape	Former Sedibeng	Vaal Gamagara	
	Namakwa	Henkries and Pella drift	Nama Khoi LM

Bloem Water is responsible for bulk water provisions to the municipalities. In some cases, the reservoirs are also part of Bloem Water network whereas in other cases the reservoirs may be operated by the municipality.

Given the large area of supply and dependency of thousands of water users on the continuous supply of high-quality water, the performance of this bulk water utility is critical to the well-being of the people serviced through the bulk supply and municipal water networks.

Regulator's Comment

Formerly Sedibeng Water

The WSP Bloem Water (former Sedibeng Water) was well prepared for the Blue Drop Audit and acknowledged for an excellent maintenance team and routine maintenance schedules. However, WSP is encouraged to update their current water safety plan to align with Blue Drop requirements, in particular site-specific risk assessment, water quality assessment and development of risk-based monitoring program.

With regards to the Balkfontein and Virginia WTW which were part of the former Sedibeng Water, the WSP is commended for the excellent operations of these two plants. Both treatment plants have functional treatment processes, competent staff, comprehensive operational monitoring, and excellent O&M capabilities which include staff, full mechanical, electrical workshop, and stock room with extensive range of spares with computerised stock control system. However, WSP is encouraged to update their current water safety plan to align with Blue Drop requirements, in particular site-specific risk assessment, water quality assessment and development of risk-based monitoring program.

There are a number of outstanding maintenance issues which have not been addressed since merging with Bloem Water due to insufficient budget. This is partially due to lack of payment by Matjhabeng LM and has negatively impacted on operations, monitoring, and reliability of the water supply. Bloem water must prioritize repairs to critical equipment and ensure there is sufficient budget to maintain the excellent condition and operations of these facilities to ensure they are able to produce reliable supply of safe water at all times. If the problem of funding is not addressed, these two excellent WTW will slide into non-functional state leading to poor water quality and insufficient supply. The Balkfontein WTW is a large bulk regional plant (capacity of 360ML/d): failure of this treatment plant will negatively impact on the health of the large population in the Free State region. Bloem Water should take this opportunity to engage, share and learn from their "Sedibeng Water" colleagues to ensure all plants have excellent systems and procedures that will ensure delivery of reliable supply of safe water to all consumers.

Caledon River

The WSP Bloem Water was well prepared for the Blue Drop Audit and acknowledged for an excellent maintenance team and routine maintenance schedules. However, WSP is encouraged to update their current water safety plan to align with Blue Drop requirements, in particular site-specific risk assessment, water quality assessment and development of risk-based monitoring programs.

Orange River

The Bloem Water team from the Orange River region is commended for their performance during the Blue Drop audits. The team was well represented at both audit and site visit with excellent POE for all criteria which was uploaded on IRIS. The WSP is encouraged to improve their Water Safety Plan and develop risk-based monitoring programs for all treatment plants. The WSP is further encouraged to include Kopanong LM in this exercise as this will support the WSA to implement risk management processes.

Blue Drop Findings

The Regulator summarises the collective recommendations as following:

- Process control staff and operational monitoring in place for all plants.
- Water Safety plan in place for WSP Bloem Water, however compliance monitoring is not risk-based for bulk system.
- Operational budgets and expenditure systems are in place but can be refined to reflect on water services (cost determination per supply system).

Technical Site Inspection

Former Sedibeng Water Plants

The Balkfontein WTW and the Virginia WTW were inspected to verify the Blue Drop audit findings and received a technical site score of 82% (Balkfontein) and 88% (Virginia) respectively. The general impression of both WTW is excellent as both treatment plants have functional treatment processes, competent staff, comprehensive operational monitoring, and excellent O&M capabilities. The potable water produced by both treatment plant complies with microbiological limits.

Due to lack of payment by Matjhabeng LM, supply is restricted to the municipality. The lack of budget has led to a number of outstanding maintenance issues which have not been addressed:

- Repairs to filters and backup pumps at Balkfontein WTW
- back up raw water pumps and repairs to filters at Virginia WTW
- reduced frequency of E. Coli testing due to lack of reagents. This is a high risk as the plant supplies water to a large population including Matjhabeng LM who is currently not conducting compliance monitoring due to budget constraints.

Caledon River

The Welbedacht water treatment plant is in need to maintenance to ensure delivery of safe drinking water.

There is an excellent mechanical workshop fully equipped for manufacture of valves, pipelines, gasket, etc, electrical workshop and fully stocked spares room. However, most unit processes need repairs/refurbishment i.e., clariflocculator is in process of refurbishment, 1 pulsator not working, 2 filters are not working, chemical dosing facility in a very poor state, reservoir lid is rusted, etc. At many processes, standby equipment is removed for repairs. Management must ensure the extensive maintenance resources at the plant are used effectively to ensure all process units are operational at all times with sufficient backup of critical equipment.

Bloem Water is commended for full time SHEQ officer and commitment to OHS. However, several OHS risks were observed on site and there is a lack of safety signs around pulsators and sedimentation tanks.

Acknowledgement is given for the installation of conduit hydropower plant at Brandkop to generate around 800MWH /year which is used to power office and UPS system for telemetry. This excellent initiative should be extended to other reservoirs to generate renewable energy.

DWS is responsible for maintenance of the dam wall. The issue of dam siltation must be addressed as the current dam capacity is estimated at 5% of the total capacity and high silt load has damaged horizontal screens, inlet pumps and leads to blockages of inlet pipeline.

Orange River

The Bethulie water treatment plant is in excellent condition with all unit processes operating effectively, onsite maintenance teams, competent staff, and dedicated management team. There is excellent housekeeping, operational monitoring, routine maintenance of all equipment and routine inspections of infrastructure.

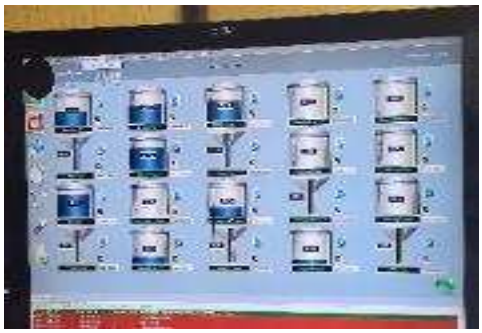
Installation of safety signs at chlorine room and chemical dosing is excellent but missing at other unit processes.

The plant is however only operating at 18% of design due to restricted flow to the municipality due to lack of payment. This results in water shortages in the municipality with routine water shedding taking place.

Excellent stock room at Virginia WTW

Excellent chemnical dosing system at Bethulie WTW

Welbedacht Bloem Water team during site inspection



SCADA system at Balkfontein WTW

Excellent OHS at chlorine dosing faciilty at Bethulie WTW

Bulk chemical storage at Balkfontein WTW

4.2 Dihlabeng Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	76.62%
Blue Drop Score 2014	%	61.59%
Blue Drop Score 2012	%	68.59%
Blue Drop Score 2011	%	30.76%

Key Performance Area	Weight	Bethlehem Water Supply System	Clarens Water Supply System	Fouriesburg Water Supply System
Bulk/WSP		-	-	-
Capacity Management	15%	62.00%	62.00%	62.00%
DWQ Risk Management	20%	56.00%	57.00%	61.50%
Financial Management	10%	82.50%	76.25%	88.75%
Technical Management	20%	82.25%	67.50%	74.50%
DWQ Compliance	35%	84.50%	86.50%	75.00%
Bonus	10%	31.25%	25.00%	25.00%
Penalties	10%	0.00%	0.00%	0.00%
Disqualifiers		None	None	None
Blue Drop Score 2023	%	**77.12%**	**73.98%**	**73.50%**
Blue Drop Score 2014	%	66.80%	61.05%	40.18%
Blue Drop Score 2012	%	71.74%	60.51%	61.25%
Blue Drop Score 2011	%	31.49%	24.40%	27.88%
System Design Capacity	kL/d	40 000	1 001	5 184
System Available Capacity	kL/d	40 000	1 008	5 180
System Input Value	kL/d	27 325	901	3 641
Capacity Utilisation	%	68.31%	89.38%	70.29%
Average Daily Consumption	l/p/d	284	128	185
Resource Abstracted From		Sol Plaatje Dam (Liebenbergsvlei and Ash River)	Small Caledon and Tunnel	Caledon, Storage Dam Meirings kloof
Microbiological Compliance	%	99.57%	99.99%	99.99%
Chemical Health Compliance	%	99.63%	99.99%	99.99%
Risk Defined Compliance	%	94.16%	93.50%	99.15%
VROOM	Rand	-	**R829 400**	**R3 066 139**
BDRR 2023	%	31.72%	23.28%	23.31%
BDRR 2022	%	67.80%	47.10%	74.70%

Introduction

The Bethlehem, Fouriesburg and Clarence drinking water supply systems are owned, operated, and maintained by the Dihlabeng municipality. The total population served is 122 908.

Raw water is abstracted from the Sol Plaatje Dam, Caledon and small Caledon Rivers and the storage dam at Meiringskloof. A Water Use License is available for the Fouriesburg supply systems and evidence of applications submitted for the other two systems are on the IRIS. A new plant is under construction for Clarens and various projects for upgrading and refurbishment and the other two water treatment plants have commenced.

Regulator's Comments

The Dihlabeng municipality was represented by a multidisciplinary team. Representatives from executive management were present for almost the full first day. The Inspectors have observed commitment towards the programme, excellent leadership, and good team dynamics. The municipality can be proud of this Team, led by the Manager, Water and Sanitation. The DWS wishes to commend the highly passionate, enthusiastic, and committed officials for their efforts to achieve excellence. This was evident from the time of reception of the Inspectors, welcomed by the Executive Mayor and the Acting Municipal Manager up to the finalisation of the score cards.

The registration of all the water treatment plants were finalised and the recommendations with regards to process controlling staff were attended to. A 100% compliance is achieved at all three water treatment plants. Evidence on the competency of contracted service providers was uploaded, improving the score for capacity management.

The municipality is also commended on the availability of water safety plans, process audit/condition assessment, and network inspection reports, all done internally. There is room for improvement in the content and quality of these reports. The team shows a keen interest in learning. Comments in the Confirmation Feedback Report were applied, and the evidence of changes implemented was available at confirmation.

Financial information was provided per cost driver and although there is one global budget, ringfenced for water only, budget and expenditure were split per system. In some instances, actual expenditure can be calculated, and examples were provided. With systems already in place, the municipality is urged to, in cooperation with the Finance Department, ringfence budget and expenditure per supply system for the next Blue Drop cycle. Information was provided on capital budgets and expenditure for all three supply systems, which include the construction of a new WTW at Clarens, upgrading of abstraction point and reservoir at Fouriesburg and the planned upgrading of the Saulspoort WTW.

Microbiological quality compliance varied between 99.56% and 99.99%. The municipality has however not implemented drinking water quality monitoring programmes aligned with SANS 241-2:2015 requirements. It also appeared that the municipality lacks an understanding of a risk defined programme and the interpretation of the SANS 241 requirements for a compliant monitoring programme. Improved, structured, risk-informed monitoring programmes are required to be designed and implemented.

Although training was done, specific training needs must be identified and planned for in cooperation with the Department of Human Resources. Recordkeeping must be standardised across the supply systems and templates provided to ensure that required information is not omitted.

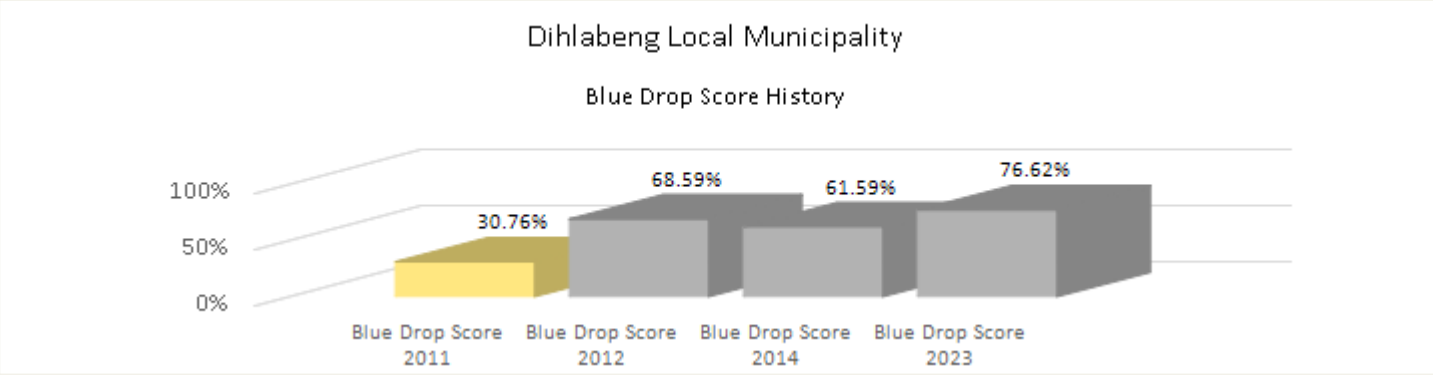
The Department wants to congratulate the municipality on the improvement against the 2014 Blue Drop scores and the 2022 BDRR. Although there is still room for ample improvement in the Blue Drop scores, all plants are residing in the low-risk zone with BDRR deviations below 32%. The Department wants to encourage the municipality to continue with the good work, identify the shortcomings, adequately plan for improvement, and strive for Blue Drop Certification in 2024.

Blue Drop Findings

Collective findings and recommendations are as follows:

- WaSPs are available for all three supply systems but need improvement on site specific hazard identification and assessment.
- Water quality risk assessments were not done per supply system and compliance monitoring programmes are not risk defined. Programmes must be aligned with SANS 241, Part 2.
- Process audits were done by an internal team.
- Condition assessment and network inspection reports lack adequate information on civil, mechanical, and electrical condition of infrastructure.
- Financial information was provided per cost driver with a percentage split per supply system. The municipality is advised to plan towards the implementation of actual site-specific financial management.
- No information was made available on water conservation and demand management. Water loss monitoring and demand management must be implemented.
- There are no records for the verification of laboratory instruments at the operational laboratories. Quality control measures must be implemented, and records must be available.
- Log sheets and registers are hand-drawn and not standardised. It is advised that templates be provided for at least daily operational measurements, incident registers and jar testing.

- A maintenance plan is available with reference to asset condition. Records are mainly for repairs and there are no maintenance records linked to a site-specific maintenance schedule.
- Flow meters at both Fouriesburg and Clarens WTPs were dysfunctional, but new meters were delivered while the Audit Team was on site.



Technical Site Assessment

The ***Clarens water treatment plant*** was inspected and received a technical site score of 68%. A new plant is under construction and the Audit Team then also spent time on various administrative and support aspects. Recommendations were made regarding the use of standardised templates like logbooks and incident management registers. The operation and maintenance of laboratory equipment and the use of quality control measures to ensure credible results were discussed and advice provided. It is commendable that despite all the activities on site, the Process Controllers continue to execute their tasks and produce water of excellent microbiological quality. Refer to the Blue Drop Watch Report 2023 for more detail.

The Audit Team also inspected the Fouriesburg water treatment plant. A technical site score of 68% was achieved. There are matters that must be attended to. This includes institutional information at the entrance, safety, containing of spillages and the provision of standby equipment where applicable. The plant produces drinking water of excellent microbiological quality. Refer to the Blue Drop Watch Report 2023 for more detail.

Blue Drop Audit Team welcomed by Executive Mayor, Acting MM, Acting CFO, HR Manager and Manager Water and Sanitation and his Team

DWS Audit Team at work

Clarens Operational laboratory; instruments all well maintained and in working condition. Analyses are performed and results recorded

Townsend dam. The Clarens water treatment plant receives raw water from the Caledon River via the Townsend dam

The Blue Drop Audit Team with the Clarens site inspection team

4.3 Kopanong Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	57.92%
Blue Drop Score 2014	%	67.29%
Blue Drop Score 2012	%	68.70%
Blue Drop Score 2011	%	43.81%

Key Performance Area	Weight	Bethulie 	Fauresmith 	Gariep 	Jagersfontein 
Bulk/WSP		Bloem Water	Bloem Water	Bloem Water	Bloem Water
Capacity Management	15%	54.80%	54.64%	54.80%	54.80%
DWQ Risk Management	20%	49.70%	49.18%	49.70%	49.70%
Financial Management	10%	51.65%	47.65%	47.65%	51.65%
Technical Management	20%	46.25%	32.75%	46.25%	34.25%
DWQ Compliance	35%	63.00%	71.87%	79.80%	54.00%
Bonus	10%	30.00%	30.00%	30.00%	30.00%
Penalties	10%	20.00%	0.00%	0.00%	20.00%
Disqualifiers		None	None	None	None
Blue Drop Score 2023	%	54.88%	56.75%	62.36%	50.08%
Blue Drop Score 2014	%	69.31%	61.87%	68.67%	66.08%
Blue Drop Score 2012	%	72.45%	43.15%	69.32%	47.30%
Blue Drop Score 2011	%	48.89%	NA	46.17%	NA
System Design Capacity	kL/d	12 000	2 750	2 800	2 120
System Available Capacity	kL/d	12 000	2 750	2 800	2 120
System Input Value	kL/d	1 183	570	789	564
Capacity Utilisation	%	17.88%	62.78%	28.18%	65.20%
Average Daily Consumption	l/p/d	79	114	113	81
Resource Abstracted From		Orange	Boreholes	Gariep	Kalkfontein
Microbiological Compliance	%	89.41%	99.99%	99.99%	93.75%
Chemical Health Compliance	%	99.99%	99.99%	99.99%	99.99%
Risk Defined Compliance	%	94.55%	100.00%	100.00%	94.44%
VROOM	Rand	R240 000	-	-	-
BDRR 2023	%	40.46%	32.16%	17.90%	48.08%
BDRR 2022	%	76.00%	91.60%	78.70%	95.40%

Key Performance Area	Weight	Philippolis	Reddersburg	Springfontein	Trompsburg
Bulk/WSP		Bloem Water	Bloem Water	Bloem Water	Bloem Water
Capacity Management	15%	52.88%	76.74%	57.94%	52.13%
DWQ Risk Management	20%	44.90%	51.67%	47.87%	47.37%
Financial Management	10%	46.95%	56.80%	47.65%	51.65%
Technical Management	20%	38.58%	42.58%	40.76%	37.25%
DWQ Compliance	35%	63.60%	68.48%	71.68%	68.07%
Bonus	10%	30.00%	30.00%	30.00%	30.00%
Penalties	10%	10.00%	0.00%	10.00%	20.00%
Disqualifiers		None	None	None	None
Blue Drop Score 2023	%	**52.83%**	**62.26%**	**57.52%**	**53.98%**
Blue Drop Score 2014	%	69.22%	56.73%	70.76%	66.93%
Blue Drop Score 2012	%	62.37%	73.02%	70.13%	72.34%
Blue Drop Score 2011	%	45.93%	26.54%	41.59%	47.59%
System Design Capacity	kL/d	1 623	147 163	12 430	13 028
System Available Capacity	kL/d	1 623	147 163	12 275	13 028
System Input Value	kL/d	569	3 106	526	1 321
Capacity Utilisation	%	43.80%	69.60%	60.81%	63.11%
Average Daily Consumption	l/p/d	57	444	53	132
Resource Abstracted From		Orange River; Boreholes	Fouriespruit	Boreholes	Boreholes
Microbiological Compliance	%	96.92%	99.07%	99.99%	99.41%
Chemical Health Compliance	%	99.99%	99.99%	99.99%	99.99%
Risk Defined Compliance	%	98.10%	99.05%	97.65%	96.06%
VROOM	Rand	-	**R36 250 000**	-	-
BDRR 2023	%	27.59%	37.47%	23.61%	34.14%
BDRR 2022	%	94.20%	100.00%	88.80%	84.70%

Introduction

Kopanong LM is the designated WSA responsible for reticulation network of all eight water supply systems. Bloem Water is the WSP for all water supply systems and provides water from several water treatment plants and boreholes.

- Bethulie WSS receives 100% water from the Bethulie WTW.
- Edenburg WSS receives 89% from Welbedacht WTW and 11% from boreholes.
- Fauresmith WSS receives 96% of water from the Jagersfontein WTW and 4% from boreholes.
- Gariep WSS receives 100% of water from the Gariep WTW.
- Jagersfontein WSS receives 100% of water from the Jagersfontein WTW.
- Philippolis WSS receives 52% of water from the Philippolis WTW and 48% from boreholes.
- Springfontein WSS receives 48% of water from the Bethulie WTW and 52% from boreholes.
- Trompsburg WSS receives 33% of water from the Bethulie WTW and 67% from boreholes.

Regulator's Comments

Kopanong LM has challenges associated with insufficient budget which is negatively impacting on the effective delivery of water services and water quality. The lack of a qualified maintenance team, routine maintenance program, and service level agreements with external contractors, present a high risk with regards to ensuring integrity of the network and delivery of reliable supply of safe water. There was no compliance monitoring undertaken in the network due to insufficient budget. The WSA has uploaded limited water quality data for microbiological determinants which is conducted by the District Municipality. However, this data indicates microbiological failures for several systems namely Bethulie, Trompsburg, Jagersfontein, and Philippolis. In the absence of water quality incident registers, which should be used to show that these water quality failures have been corrected or mitigated, the water quality in these systems present a serious health risk to consumers. The financial leadership of the municipality must ensure that adequate budget is allocated for compliance monitoring in the network, amongst the other shortcomings. In addition, Water Safety Planning and water quality incident reporting will ensure water quality risks are managed and mitigated thereby reducing health risk to consumers.

The Bloem Water team from the Orange River region is commended for their performance during the Blue Drop audits. The team was well represented at both audit and site visit with an excellent PoE for all criteria, which was uploaded on IRIS. The WSP is encouraged to improve their Water Safety Plan and develop risk-based monitoring programs for all treatment plants. The WSP is further encouraged to include Kopanong LM in this exercise as this will transfer skills to the WSA to implement risk management processes. The municipal Blue Drop score of 56.28% indicates average overall performance against the Blue Drop criteria and marks a slight decline from the 2014 BD score of 67.29%.

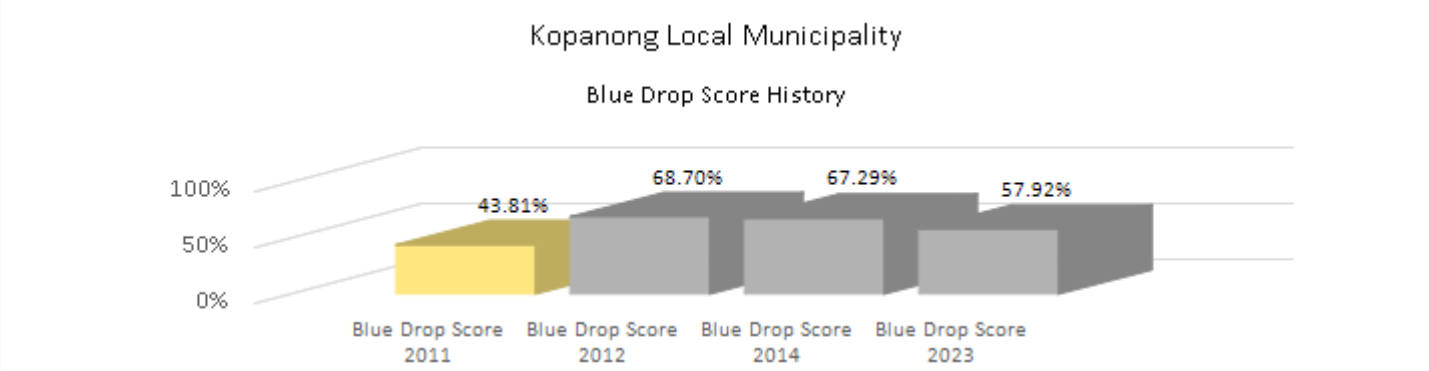
A capital budget is available to address some of the shortcomings identified during the audit:

- R65,000,000 for the upgrade of the bulk water pipeline in the Bethulie water supply area, with R 62 000 000 already spent.
- R51,739,913 for the supply and installation of mechanical and electrical equipment as part of WTW phase 2, Jagersfontein supply system. Overspent by R77,352,658
- R53,000,000 spent on Edenburg/ Reddersburg system for upgrade of WTW operated by Bloem Water, R189,000,000 spent on valves, pipes, VSD at high lift pumpstation.

Blue Drop Findings

The Regulator finds the 8 WSS exhibited similar shortcoming, and summarises the collective recommendations as following:

- Process control staff and operational monitoring in place for all WSS.
- Maintenance team qualifications and maintenance logbooks to be improved.
- Approved contracts must be secured and finalised for outsourced services to cover maintenance, spares, calibration of meters and supply of chemicals.
- Water safety plan in place for WSP Bloem Water, however compliance monitoring is not risk-based for bulk system.
- WSA to implement water safety planning and risk-based monitoring program aligned with SANS 241 requirements to ensure delivery of safe water at all times.
- Operational budgets and expenditure systems are in place but can be refined to reflect on water services.
- Water balances or water loss monitoring and demand management to be undertaken in the reticulation network.



Technical Site Assessment

The Bethulie WTW is operated by Bloem Water and was inspected to verify the Blue Drop audit findings and received a technical site score of 95%.

The general impression is that the WTW is in excellent condition with all unit processes operating effectively, on-site maintenance teams, competent staff, and dedicated management team. The potable water produced by the treatment plant complies with microbiological limits. Refer to the Blue Drop Watch Report 2023 for more detail.

Duty standby chemical dosing p pumps at Bethulie WTW

Good safety practice for chlorine handling at Bethulie WTW

Final water pumpstation with duty standby pumps

4.4 Letsemeng Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	32.88%
Blue Drop Score 2014	%	62.56%
Blue Drop Score 2012	%	49.98%
Blue Drop Score 2011	%	54.69%

Key Performance Area	Weight	Jacobsdal WTW	Koffiefontein	Luckhoff	Oppermangronde
Bulk/WSP		-	-	-	-
Capacity Management	15%	48.00%	50.00%	48.00%	52.00%
DWQ Risk Management	20%	32.00%	29.50%	28.00%	32.00%
Financial Management	10%	58.75%	64.75%	54.75%	54.75%
Technical Management	20%	11.00%	0.00%	0.00%	0.00%
DWQ Compliance	35%	35.00%	35.00%	39.00%	35.00%
Bonus	10%	6.25%	6.25%	6.25%	6.25%
Penalties	10%	7.50%	5.00%	0.00%	0.00%
Disqualifiers		None	None	None	None
Blue Drop Score 2023	%	**33.80%**	**32.25%**	**32.55%**	**32.55%**
Blue Drop Score 2014	%	57.76%	65.82%	42.81%	60.53%
Blue Drop Score 2012	%	47.24%	52.44%	47.24%	47.24%
Blue Drop Score 2011	%	70.51%	50.65%	51.00%	53.30%
System Design Capacity	kL/d	4 200	4 500	1 352	720
System Available Capacity	kL/d	4 200	0	0	0
System Input Value	kL/d	1 760	4 500	1 352	720
Capacity Utilisation	%	41.90%	NI	NI	NI
Average Daily Consumption	l/p/d	201	433	224	467
Resource Abstracted From		Kalkfontein Scheme (Riet River)	Kalkfontein scheme (Riet River); also from Orange-Riet during droughts	Oranje-Riet WUA (Vanderkloof Dam)	Oranje-Riet WUA (Vanderkloof Dam)
Microbiological Compliance	%	57.50%	77.95%	94.50%	92.31%
Chemical Health Compliance	%	99.99%	99.99%	99.51%	99.99%
Risk Defined Compliance	%	90.17%	92.32%	78.74%	85.21%
VROOM	Rand	**R1 562 000**	-	-	-
BDRR 2023	%	44.21%	49.10%	41.25%	56.56%
BDRR 2022	%	46.30%	60.90%	46.70%	57.90%

Key Performance Area	Weight	Petrusburg
Bulk/WSP		-
Capacity Management	15%	48.00%
DWQ Risk Management	20%	32.00%
Financial Management	10%	64.75%
Technical Management	20%	8.00%
DWQ Compliance	35%	34.00%
Bonus	10%	6.25%
Penalties	10%	0.00%
Disqualifiers		None
Blue Drop Score 2023	%	**34.20%**
Blue Drop Score 2014	%	63.50%
Blue Drop Score 2012	%	44.93%
Blue Drop Score 2011	%	50.00%
System Design Capacity	kL/d	1 285
System Available Capacity	kL/d	2 938
System Input Value	kL/d	1 450
Capacity Utilisation	%	NI
Average Daily Consumption	l/p/d	162
Resource Abstracted From		Thirteen boreholes
Microbiological Compliance	%	93.91%
Chemical Health Compliance	%	99.02%
Risk Defined Compliance	%	96.04%
VROOM	Rand	-
BDRR 2023	%	52.98%
BDRR 2022	%	31.60%

Introduction

- The Letsemeng Local Municipality serves a population of 37 862 where water is supplied through five drinking water supply systems.
- The Petrusburg supply system receives water from 13 boreholes. The combined borehole yield is adequate to meet the projected demand of 2 937 kl/d based on a 12-hour working day.
- Raw water is supplied from the Orange-Riet and Kalkfontein canal schemes.

Regulator's Comments

During the on-site assessment, the WSA was represented by officials from management, the Superintendent-Water, and the Pump Technician. Only the Manager Water and Sanitation was present at the confirmation audit. Information was not available on the IRIS and was mostly made available only at or following the confirmation audit. Since the on-site assessment the registration of all water treatment plants were finalised, and the Supervisor was linked to all supply systems.

Process Controllers are registered for all systems, but regulatory requirements are not met. The DWS wants to give credit to the municipality for having provided Process Controllers with NQF training. The profiles of the individuals must be updated on the IRIS. Compliance with process controlling requirements is mandatory and the WSA must ensure that training and appointment of staff are aligned with regulatory requirements.

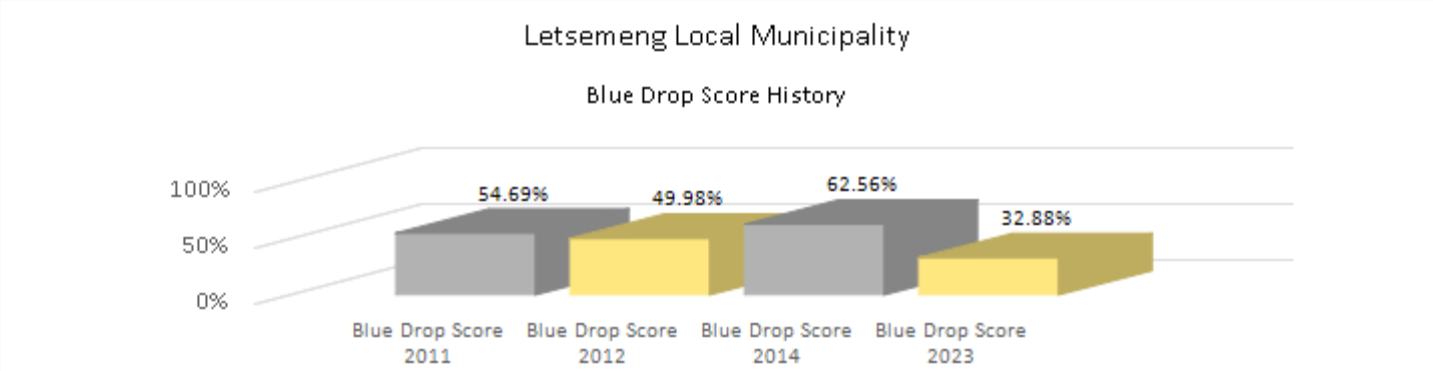
Except for Petrusburg supply system, the BDRR for all systems has improved. The individual Blue Drop scores have however decreased with all scores being between 30 and 35%. This has been the trend since the 2011 Blue Drop assessments. This poor performance is mainly as result of poor technical management, microbiological failures and the absence of process audit and network inspection reports and water safety plans (WaSPs). None of these documents were available at the confirmation audit and reported not to be done. No flow data was provided for this assessment period. The lack of flow monitoring was also raised during the 2014 Blue Drop assessment. This matter requires urgent rectification.

The municipality is commended on the implementation of operational and compliance monitoring for all supply systems. The Compliance programmes are however not risk defined and aligned with SANS 241, Part 2. Water quality risks assessments are required and should form part of the water safety planning process. Water quality results are available on IRIS. Uploading of results are often not on time and has also resulted in incorrect capturing adversely affecting monthly monitoring compliance. Microbiological compliance is concerning and has been raised as a concern in both the 2012 and 2014 Blue Drop Reports. Boil water alert notices were issued, but the cause of the poor performance has not been investigated and resolved. The DWS has serious concerns about the poor microbiological drinking water quality. The WSA is urged to immediately attend to this matter. The public is exposed to an acute health risk associated with the presence of pathogens in the drinking water.

Financial information was provided and broken down per cost driver, but not per supply system. Asset management needs urgent attention and poor performance has been noted since 2012. This is a continuing situation reported in both the 2012 and 2014 Blue Drop Reports.

Blue Drop Findings

- A compliant shared Supervisor is in employment. Process Controlling staff however does not meet regulatory requirements.
- Continuing poor microbiological compliance is of great concern. Although boil water notices were issued, the cause of the non-compliance has not been addressed.
- The WaSP for Koffiefontein has not been updated and WaSPs have not been compiled for the other systems. Findings as captured in the reports by Chell Engineering could have been used to commence with the completion of risk registers.
- Process audits and network inspections were not conducted. A Water Master Plan was done by Chell Engineering in 2019.
- Asset registers were not presented, and no maintenance records were made available. An Operations and Maintenance Plan compiled in 2019 by Chell Engineering is on the IRIS. No proof of implementation was available.
- Insufficient maintenance capacity.
- Except for the Jacobsdal water treatment plant, and borehole yield for the Petrusburg supply system, design capacities could not be confirmed. No flow records were made available.

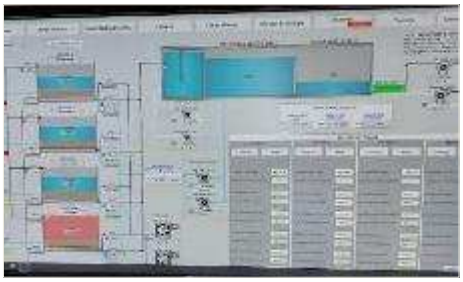


Technical Site Assessment

The ***Jacobsdal treatment plant*** was inspected to verify the Blue Drop desk audit findings. This is a newly constructed plant and in operation only for about two years prior to the site inspection. The site received a technical site score of 81%. Daily printouts from online monitoring are available from Scada. It was however clear that this information is not used by the Process Controllers. The potable water produced by the treatment plant is not microbiologically safe and poses an acute health risk to consumers.

Refer to the Blue Drop Watch Report 2023 for more detail.

Municipal Blue Drop Team: Budget accountant, SCM Manager, Superintendent Water, Manager Infrastructure and Manager Water and Sanitation



Jacobsdal WTW Scada display

2 x pump sets pumping from clear water sump to large on-site concrete reservoir. Four pumps in high lift pump station, pumping from concrete reservoir to reservoirs in distribution

4.5 Mafube Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	4.25%
Blue Drop Score 2014	%	28.75%
Blue Drop Score 2012	%	18.16%
Blue Drop Score 2011	%	15.25%

Key Performance Area	Weight	Frankfort	Tweeling	Villiers
Bulk/WSP		-	-	-
Capacity Management	15%	28.00%	18.00%	18.00%
DWQ Risk Management	20%	4.00%	0.00%	0.00%
Financial Management	10%	0.00%	0.00%	0.00%
Technical Management	20%	0.00%	0.00%	0.00%
DWQ Compliance	35%	0.00%	0.00%	0.00%
Bonus	10%	0.00%	0.00%	0.00%
Penalties	10%	50.00%	50.00%	50.00%
Disqualifiers		None	None	None
Blue Drop Score 2023	%	5.00%	2.70%	2.70%
Blue Drop Score 2014	%	31.84%	21.22%	27.27%
Blue Drop Score 2012	%	18.35%	17.45%	18.24%
Blue Drop Score 2011	%	15.25%	15.25%	15.25%
System Design Capacity	kL/d	14 400	2 000	5 000
System Available Capacity	kL/d	7 200	2 000	4 150
System Input Value	kL/d	14 400	2 000	5 000
Capacity Utilisation	%	NI	NI	NI
Average Daily Consumption	l/p/d	423	256	239
Resource Abstracted From		Wilger River	Liebensburgvlei River	Vaal River
Microbiological Compliance	%	0.00%	0.00%	0.00%
Chemical Health Compliance	%	0.00%	0.00%	0.00%
Risk Defined Compliance	%	0.00%	0.00%	0.00%
VROOM	Rand	R5 040 000	-	-
BDRR 2023	%	98.10%	100.00%	100.00%
BDRR 2022	%	95.10%	94.60%	95.10%

Introduction

The Mafube Local Municipality is situated in the Northeast of the Province of the Free State. They are responsible for the potable water supply to the communities of Frankfort, Tweeling and Villiers. The municipality has no bulk water suppliers providing potable water to them. The total design capacity of the three treatment plants is 21,400 kL/d, and the system input volume is 13,350 kL/d.

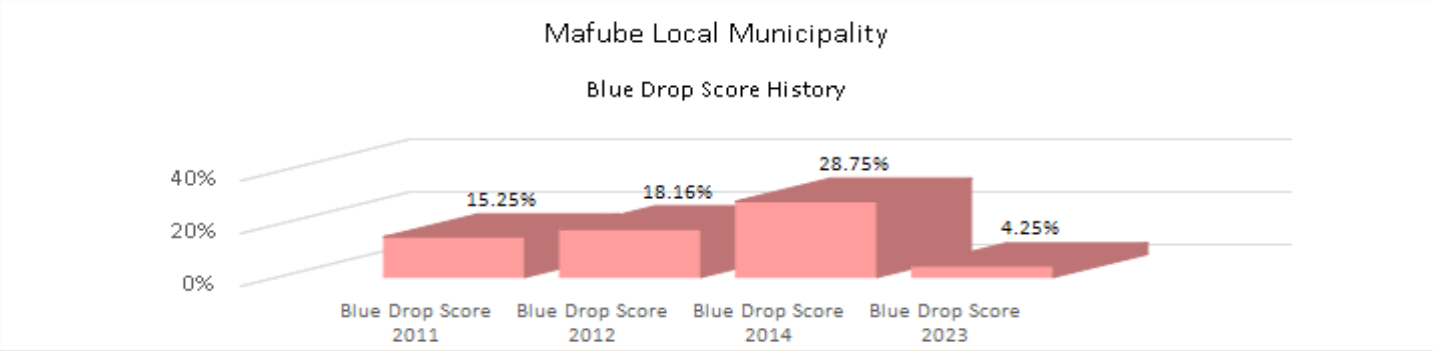
Regulator's Comments

The municipal staff that attended the on-site assessment were unprepared for the Blue Drop assessment. One of the reasons was that staff in technical positions were not in attendance. The Acting Technical Director also fulfills the role of the Water Quality Manager and acting in the Water & Sanitation divisions. Available evidence was mostly presented in the form of electronic copies on the WQ Managers computer, but not uploaded onto the IRIS platform. Despite requests by the Regulator to upload the documents, this was not done by the time of the close of the audit process. The audit team appreciates the members of the municipality who endeavored their best to participate in the assessment and site assessment under the circumstances.

No capital budgets or operational expenditure were presented to indicate that the non-compliance and staff shortfalls are being addressed. The municipal Blue Drop score of 4.25% and high BDRR score of 95% for all systems indicate that drinking water supply is in dire condition and in critical risk space. The Blue Drop score declined even further from the last audit score of 28.75% in 2014, indicating that the municipality has not been able to correct these failed systems over the last 9 years. The Mafube residents cannot have confidence in their drinking water supply or water quality as SANS 241 compliance cannot be proven. Penalties apply to all systems as the public is not being informed of the drinking water quality failures or lack of monitoring to ensure safe use of water.

Blue Drop Findings

The results above show that all key performance areas scores are at 0% or low scores. Limited evidence is presented on operational, supervisory and maintenance capacity. No evidence was presented that water quality risk management is in place, except for site-based log sheets that were in place for Frankfort WTW. No evidence was presented to show that budgets, expenditure, and capital programmes were in place. No technical evidence was in place, indicating a gap in condition assessment, knowledge of the infrastructure, no asset registers, and no network inspections being done. Drinking water quality cannot be ascertained as no monitoring or laboratory services were in place.



Technical Site Assessment

The ***Frankfort WTP*** is in a dysfunctional state, earning a TSA score of 44%. The staff are knowledgeable and have the desire to have the plant fully functional, however this support and enabling environment from top management and Council seems to be lacking. Water quality is monitored where possible, according to SANS 241, and the overall health and safety can be improved to ensure a safe working environment and improved workplace morale. Refer to the Blue Drop Watch Report 2023 for more detail.

Lime dosing equipment in poor state

Highlift pumpstation floor under water

Circular flocculation channel in desperate need of refurbishment

The Regulator notes the dire state of management and drinking water quality in the Frankfort, Tweeling and Villiers water supply systems. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

4.6 Maluti-A-Phofung Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	17.68%
Blue Drop Score 2014	%	97.66%
Blue Drop Score 2012	%	86.00%
Blue Drop Score 2011	%	88.94%

Key Performance Area	Weight	Bluegumbosch Supply system (Dr Limpho WTW and Fika Patso WTW)	Kestell Supply system (Dr Limpho WTW and Fika Patso WTW)	HaRankopane Supply System (Fika Patso WTW and Makwane WTW)	Mphatlalatsane Supply System (Fika Patso WTW and Makwane WTW)
Bulk/WSP		-	-	-	-
Capacity Management	15%	48.00%	48.00%	48.00%	48.00%
DWQ Risk Management	20%	9.00%	9.00%	9.00%	9.00%
Financial Management	10%	27.00%	27.00%	27.00%	27.00%
Technical Management	20%	24.50%	24.50%	24.50%	24.50%
DWQ Compliance	35%	5.00%	5.00%	0.00%	0.00%
Bonus	10%	10.00%	10.00%	10.00%	12.50%
Penalties	10%	50.00%	50.00%	50.00%	50.00%
Disqualifiers		None	None	None	None
Blue Drop Score 2023	%	19.35%	19.35%	17.60%	17.85%
Blue Drop Score 2014	%	NI	NI	NI	NI
Blue Drop Score 2012	%	NI	NI	NI	NI
Blue Drop Score 2011	%	NI	NI	NI	NI
System Design Capacity	kL/d	46 000	46 000	46 000	46 000
System Available Capacity	kL/d	46 200	46 000	46 200	46 200
System Input Value	kL/d	5 710	3 407	389	444
Capacity Utilisation	%	152.39%	152.39%	108.40%	108.40%
Average Daily Consumption	l/p/d	412	412	155	156
Resource Abstracted From		Fika Patso Dam (Namahadi River); Sterkfontein Dam (Nuwejaarspruit)	Fika Patso Dam (Namahadi River); Sterkfontein Dam (Nuwejaarspruit),	Metsimatsho Dam (Metsimatsho River), Fika Patso Dam (Namahadi River)	Metsimatsho Dam (Metsimatsho River), Fika Patso Dam (Namahadi River)
Microbiological Compliance	%	0.00%	0.00%	0.00%	0.00%
Chemical Health Compliance	%	0.00%	0.00%	0.00%	0.00%
Risk Defined Compliance	%	0.00%	0.00%	0.00%	0.00%
VROOM	Rand	-	-	-	-
BDRR 2023	%	98.37%	98.37%	89.84%	89.84%
BDRR 2022	%	NI	NI	NI	NI

Key Performance Area	Weight	Greater QWAQWA Supply System (Fika - Patso WTW)	Makwane water supply system	Harrismith water Supply System (Wilge WTW)	Tshiame Water Supply System (Dr Limpho Letsela WTW)
Bulk/WSP		-	-	-	-
Capacity Management	15%	48.00%	48.00%	48.00%	48.00%
DWQ Risk Management	20%	9.00%	0.00%	9.00%	9.00%
Financial Management	10%	27.00%	27.00%	27.00%	27.00%
Technical Management	20%	24.50%	16.50%	16.50%	24.50%
DWQ Compliance	35%	0.00%	0.00%	5.00%	5.00%
Bonus	10%	10.00%	10.00%	10.00%	10.00%
Penalties	10%	50.00%	50.00%	50.00%	50.00%
Disqualifiers		None	None	None	None
Blue Drop Score 2023	%	**17.60%**	**14.20%**	**17.75%**	**19.35%**
Blue Drop Score 2014	%	97.65%	97.90%	97.86%	Ni
Blue Drop Score 2012	%	82.28%	97.20%	96.32%	Ni
Blue Drop Score 2011	%	86.54%	95.74%	95.74%	NI
System Design Capacity	kL/d	36 000	10 000	11 200	10 000
System Available Capacity	kL/d	36 200	10 000	11 200	10 000
System Input Value	kL/d	38 406	6 656	15 310	6 121
Capacity Utilisation	%	108.40%	66.56%	142.23%	152.39%
Average Daily Consumption	l/p/d	155	353	290	412
Resource Abstracted From		Fika Patso Dam (Namahadi River)	Metsimatsho Dam (Metsimatsho River)	Wilge River	Sterkfontein Dam (Nuwejaarspruit)
Microbiological Compliance	%	0.00%	0.00%	0.00%	0.00%
Chemical Health Compliance	%	0.00%	0.00%	0.00%	0.00%
Risk Defined Compliance	%	0.00%	0.00%	0.00%	0.00%
VROOM	Rand	-	-	**R3 379 197**	-
BDRR 2023	%	90.59%	87.08%	91.47%	97.93%
BDRR 2022	%	98.50%	NI	89.30%	90.10%

Introduction

The Maluti-a-Phofung local municipality as a WSA, established MaP Water as a separate entity responsible for water and sanitation within its jurisdiction. Drinking water is supplied from four water treatment plants into eight supply systems. Areas served include Greater QwaQwa, Makwane, Greater Harrismith and Kestell with a total population of 361 062. Three of the treatment plants are operated above design capacities, with no evidence of planned upgrading presented.

Regulator's Comments

The Maluti a Phofung municipality was well-represented during the on-site assessment. Representatives from management, operations, maintenance, and the laboratory were present for the full first day.

Responsible people from Human Resources and Finance availed time during the day to verbally provide some information and agreed to upload the required evidence. The absence of cohesion was however noted and probably the reason for the lack of forthcoming information, despite many attempts by the Audit Team.

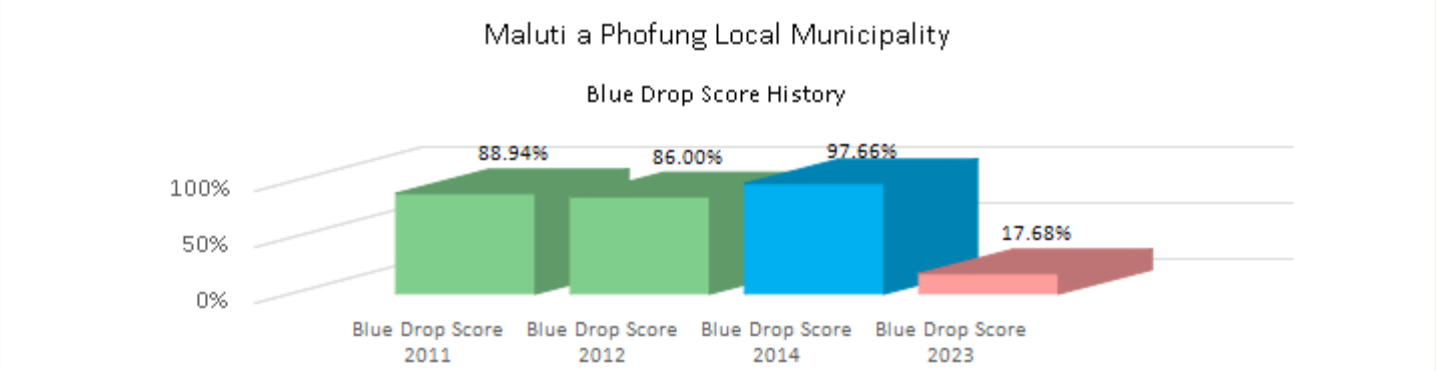
The municipality displayed very little commitment to the Blue Drop Programme and service delivery. The alarming deterioration in Blue Drop performance since 2014, is of great concern to the Regulator. Performance of the Makwane, QwaQwa and Harrismith supply systems changed from Blue Drop Certification status in 2014 to now being in a critical state and in need of urgent intervention. BDRR varied from high to critical for five of the supply systems.

Three of the treatment plants are operating above design capacity. The Makwane treatment plant is operated at 66.7 % of its capacity. The municipality should consider utilising the emergency connections to Makwane WTW to supply systems currently receiving water from the already over-utilised Fika Patso WTW. No capital budget information was made available for any planned upgrading of these systems. The registrations of water treatment plants were finalised since the on-site assessment, but the process controlling staff does not meet the requirements of Draft Regulation 813. Flow data is available and logsheets were uploaded as evidence of daily operational monitoring. Volumes supplied to the different supply systems were not available.

The municipality has not only legally, but also morally, failed to serve the people residing within the municipal boundaries. Inspectors were appalled by the absence of risk management and compliance monitoring. Compliance monitoring programmes have not been implemented in any of the supply systems. Consequently, the municipality has failed to meet its obligation to submit water quality information to the Regulator. Regrettably, there is also no evidence of communication with the public on potential risks posed by their drinking water in the absence of water quality information. A well-staffed laboratory at the Makwane WTW is not utilised and with a small financial requirement at least the minimum analyses can be performed. Municipal management needs to demonstrate their commitment and leadership through providing the funding and resources that are required to ensure improvement in the performance of the municipality.

Blue Drop Findings

- Water Use Licenses were not presented.
- Wilge Water Treatment plant has been registered since August 2022 and the registration of the others was finalised in March 2023, after the on-site assessment.
- Supervisors are meeting the requirements of Draft Regulation 813, but the municipality does not meet the requirements for Process Controllers at any of the plants. The municipality must plan for training of Process Controllers aligned with regulatory requirements.
- Except for the Makwane WTW, all plants are operated above design capacity. The municipality should consider:
- The use of the existing emergency connection to the Mphatlalatsane supply system.
- Completion of the connection to the HaRankopane supply system.
- Flow data was uploaded, but the daily volumes supplied to the various supply systems are not measured and had to be estimated by the Audit Team.
- No process audits were done.
- No risk assessments done; the incident management protocol is incomplete.
- Reports for network inspections done were uploaded. These reports were all incomplete and did not provide the required information.
- Inadequate maintenance capacity and no information on maintenance schedules and maintenances performed.
- Excessive water leakage at the Wilge water treatment plant. A WCDM Plan was compiled in 2019 (iX Engineering), including strategy and cost estimates, but no proof of implementation.
- General lack of adequate information and feedback to provide clarity on documents uploaded.
- The specific role of MAP Water as an entity needs clarification.



Technical Site Assessment

The ***Wilge water treatment plant*** was inspected to verify the Blue Drop desktop audit findings. The plant received a technical site score of 67%. Of main concern is the excessive leakages observed, apparently continuing for up to three years. The site is not well-maintained. Office and ablution facilities are in poor condition. Staff complained about working conditions adversely affecting performance. Refer to the Blue Drop Watch Report 2023 for more detail.

Raw water pump station abstracting from a weir in Wilge River. Accumulation of logs and debris during heavy rain. Flow measurement at inflow

High lift pump station

The Regulator notes the dire state of management and drinking water quality in the Bluegumbosch, Kestell, HaRankopane, Mphatlalatsane, Greater Qwaqwa, Makwane, Harrismith and Tshiame water supply systems. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

4.7 Mangaung Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	62.82%
Blue Drop Score 2014	%	77.47%
Blue Drop Score 2012	%	84.45%
Blue Drop Score 2011	%	0.00%

Key Performance Area	Weight	Bloemfontein 	Botshabelo 	Dewetsdorp 	Soutpan Krugersdrift Dam 
Bulk/WSP		Bloem Water	Bloem Water	Bloem Water	-
Capacity Management	15%	82.07%	83.50%	83.60%	42.00%
DWQ Risk Management	20%	49.00%	33.26%	51.10%	14.50%
Financial Management	10%	69.02%	72.05%	67.70%	63.50%
Technical Management	20%	40.63%	37.90%	44.75%	7.50%
DWQ Compliance	35%	76.69%	55.40%	74.20%	11.00%
Bonus	10%	40.00%	40.00%	40.00%	25.00%
Penalties	10%	0.00%	20.00%	0.00%	50.00%
Disqualifiers		None	None	None	None
Blue Drop Score 2023	%	66.98%	54.35%	67.45%	23.40%
Blue Drop Score 2014	%	778.00%	77.46%	NI	NI
Blue Drop Score 2012	%	na	71.06%	NI	NI
Blue Drop Score 2011	%	na	NA	NI	NI
System Design Capacity	kL/d	382 500	100 500	145 000	1 000
System Available Capacity	kL/d	382 500	100 500	145 000	1 000
System Input Value	kL/d	143 609	53 969	2 451	2 160
Capacity Utilisation	%	69.86%	53.46%	72.43%	216.00%
Average Daily Consumption	l/p/d	212	239	245	540
Resource Abstracted From		Welbedacht Dam, Orange River	Caledon River, Boreholes	Welbedacht Dam, Orange river	Modder dam
Microbiological Compliance	%	98.84%	96.95%	99.99%	93.75%
Chemical Health Compliance	%	99.97%	99.93%	99.99%	99.99%
Risk Defined Compliance	%	88.83%	95.44%	92.92%	55.14%
VROOM	Rand	R36 250 000	-	-	-
BDRR 2023	%	33.54%	54.40%	30.79%	86.86%
BDRR 2022	%	69.60%	93.80%	69.40%	97.20%

Key Performance Area	Weight	Thaba Nchu	Vanstadensrus	Wepener
Bulk/WSP		Bloem Water	-	Bloem Water
Capacity Management	15%	83.60%	42.00%	83.60%
DWQ Risk Management	20%	33.30%	14.50%	51.10%
Financial Management	10%	72.05%	63.50%	67.70%
Technical Management	20%	38.00%	15.50%	44.75%
DWQ Compliance	35%	50.60%	15.00%	76.20%
Bonus	10%	40.00%	25.00%	40.00%
Penalties	10%	20.00%	50.00%	0.00%
Disqualifiers		None	None	None
Blue Drop Score 2023	%	**52.71%**	**26.40%**	**68.15%**
Blue Drop Score 2014	%	76.73%	NI	NI
Blue Drop Score 2012	%	62.69%	NI	NI
Blue Drop Score 2011	%	NI	NI	NI
System Design Capacity	kL/d	118 500	300	145 000
System Available Capacity	kL/d	118 500	0	145 000
System Input Value	kL/d	602 943	481	2 367
Design Capacity Utilisation	%	0.00%	0.00%	72.43%
Average Daily Consumption	l/p/d	5 740	129	158
Resource Abstracted From		Groothoek Dam, Caledon River, Boreholes	Boreholes	Welbedacht Dam, Orange River
Microbiological Compliance	%	95.78%	90.91%	99.99%
Chemical Health Compliance	%	99.88%	99.99%	99.99%
Risk Defined Compliance	%	36.47%	94.49%	93.41%
VROOM	Rand	-	-	-
BDRR 2023	%	36.05%	69.51%	29.71%
BDRR 2022	%	55.80%	74.40%	80.20%

Introduction

The Mangaung MM is the WSA and WSP for two water supply systems, namely Vanstadensrus, and Soutpan (Krugersdrift). Each WSS has its own water treatment plant and Mangaung MM is responsible for the treatment plant and reticulation network.

The Bloemfontein system receives water from several sources:

- 10.6 % from Maselspoort WTW which is operated by Mangaung MM,
- 41% from Welbedacht WTW and 48.4% from Rustfontein WTW, both are operated by Bloem Water,
- Bloem Water is the WSP responsible for Welbedacht WTW and Rustfontein WTW while Mangaung MM is responsible for the Maselspoort WTW and the entire reticulation network of Bloemfontein.

For all other systems Bloem Water is the WSP which supplies water from a number of treatment plants:

- Botshabelo WSS receives 99,7% from the Rustfontein WTW and 0.3% from Thaba Nchu boreholes,
- Thaba Nchu WSS receives 100% of supply from the Groothoek WTW,
- Both Dewetsdorp WSS and Wepener WSS receive 100% from Welbedacht WTW,

Bloem Water is responsible for the treatment plant and bulk network while Mangaung is responsible for the reticulation network of these systems.

Regulator's Comments

Mangaung MM has maintenance teams supported by external contractors; however, routine maintenance does not take place at the treatment plant or in the network. Water safety planning requires attention as the current document is not site-specific, has generic risks, does not include a water quality assessment and there is no proof of implementation of corrective measures to reduce risks.

The compliance monitoring program is not risk-based and there is only limited data for chemical monitoring. Mangaung MM must ensure there is sufficient budget for the internal laboratory to participate in proficiency testing, as this shortcoming results in low confidence in the analytical data produced by the laboratory.

Mangaung is responsible for the treatment plant that supplies water to Vanstadensrus and Soutpan water supply systems. In both cases the final water does not meet microbiological limits. This, together with a lack of a water quality incident register to track and remedy water quality failures, implies that the final water produced by these systems poses a serious health risk to consumers. The Regulator commends Mangaung metro for the detailed water balance for the water network and encourages Mangaung to identify areas of high-water losses and implement mitigation measures to reduce these losses.

The WSP Bloem Water (former Sedibeng Water) was well prepared for the Blue Drop Audit and acknowledged for an excellent maintenance team and routine maintenance schedules. However, Bloem Water is encouraged to update their current water safety plan to align with Blue Drop requirements, in particular site-specific risk assessment, water quality assessment and development of risk-based monitoring programs.

The overall municipal Blue Drop score of 62.82% confirms an average performance for the metro`s water services. The Regulator is concerned about the decline in performance and compliance since 2014 when a Blue Drop score of 77.47% was achieved. Given that the metro is responsible for a large population`s water services and drinking water quality, systems where poor BD scores and low DWQ scores were attained present a major risk to the water users.

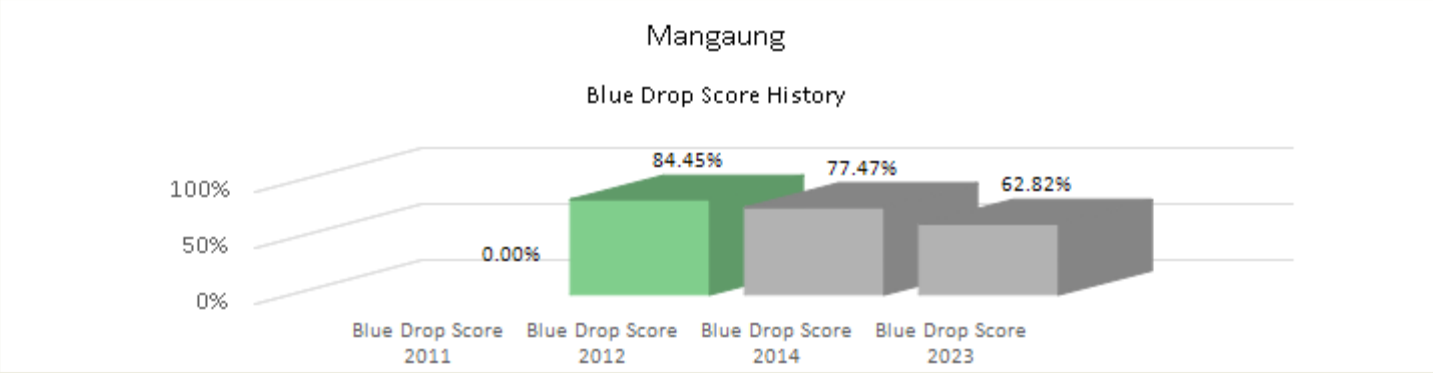
A detailed budget was provided for each WTW operated by Bloem Water and supply systems managed by the Metro:

- R53,000,000 and R 189 000 000 for valves, pipes, and VSD at high lift pumpstation.
- R262,000,000 for various projects including upgrade of WTW R12,000,000, prepaid meters R22,000,000, and upgrade of reservoirs R6,000,000. Expenditure to date is R79,000,000.

Blue Drop Findings

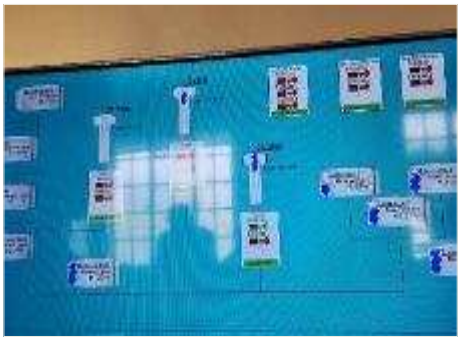
The Regulator summarises the collective recommendations for the WSA Mangaung Metro as following:

- Process control staff and operational monitoring is not in place for WSS operated by the WSA.
- Routine maintenance is required for the reticulation network.
- Lack of Water safety plan and risk-based monitoring program in the reticulation network.
- WSA to ensure there is budget for internal laboratory to participate in proficiency testing.
- WSA to implement water quality incident management protocol to address repeated failures in the network.
- Realistic operational budgets and expenditure to be compiled, as current expenditure expressed as negative value.
- WSA to ensure asset register to include condition, remaining useful life and replacement value; and used to inform the maintenance plan.
- Water balances or water loss monitoring and demand management is taking place in the reticulation network.
- For the WSP Bloem Water, Water Safety plans can be improved by identification of site-specific risks and development of risk-based monitoring programs.



Technical Site Assessment

The ***Maselspoort WTW*** was inspected to verify the Blue Drop audit findings and received a technical site score of 62%. The general impression is that the WTW needs routine maintenance and housekeeping, process controllers must be trained to conduct operational monitoring and optimise the treatment process and staff facilities must be upgraded. Refer to the Blue Drop Watch Report 2023 for more details.



Mangaung MM Telemetry system for Bloemfontein reticulation network

New chemical dosing facility at Maselspoort WTW

Poor chlorine dosing facility at Maselspoort WTW

The Regulator notes the dire state of management and drinking water quality in the Soutpan and Vanstadensrus water supply systems. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

4.8 Mantsopa Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	42.28%
Blue Drop Score 2014	%	52.78%
Blue Drop Score 2012	%	47.09%
Blue Drop Score 2011	%	38.48%

Key Performance Area	Weight	Excelsior	Hobhouse	Ladybrand	Thaba Phatchoa
Bulk/WSP		Bloem Water	-	-	-
Capacity Management	15%	77.68%	58.00%	68.00%	58.00%
DWQ Risk Management	20%	51.71%	49.00%	57.00%	49.00%
Financial Management	10%	79.44%	76.00%	76.00%	76.00%
Technical Management	20%	22.51%	15.50%	15.50%	15.50%
DWQ Compliance	35%	44.29%	11.00%	36.00%	41.00%
Bonus	10%	34.76%	20.00%	20.00%	20.00%
Penalties	10%	25.40%	50.00%	50.00%	0.00%
Disqualifiers		None	None	None	None
Blue Drop Score 2023	%	50.88%	30.05%	41.90%	45.55%
Blue Drop Score 2014	%	58.48%	40.99%	54.03%	47.06%
Blue Drop Score 2012	%	79.36%	39.78%	40.98%	52.15%
Blue Drop Score 2011	%	48.25%	30.10%	48.08%	41.61%
System Design Capacity	kL/d	100 720	1 640	10 800	600
System Available Capacity	kL/d	100 720	1 640	10 330	600
System Input Value	kL/d	910	129	9 291	274
Capacity Utilisation	%	77.25%	7.87%	88.87%	45.67%
Average Daily Consumption	l/p/d	127	49	270	171
Resource Abstracted From		Caledon River	Caledon River	Caledon River	Qahang River
Microbiological Compliance	%	95.88%	90.00%	97.22%	99.99%
Chemical Health Compliance	%	99.99%	99.99%	99.99%	99.99%
Risk Defined Compliance	%	84.68%	60.61%	72.58%	71.43%
VROOM	Rand	-	-	R16 308 000	-
BDRR 2023	%	51.06%	55.38%	47.90%	38.47%
BDRR 2022	%	53.50%	70.90%	43.10%	56.90%

Key Performance Area	Weight	Tweespruit
Bulk/WSP		-
Capacity Management	15%	62.00%
DWQ Risk Management	20%	49.00%
Financial Management	10%	76.00%
Technical Management	20%	15.50%
DWQ Compliance	35%	11.00%
Bonus	10%	20.00%
Penalties	10%	50.00%
Disqualifiers		None
Blue Drop Score 2023	%	**30.65%**
Blue Drop Score 2014	%	38.44%
Blue Drop Score 2012	%	41.28%
Blue Drop Score 2011	%	27.53%
System Design Capacity	kL/d	1 400
System Available Capacity	kL/d	1 400
System Input Value	kL/d	309
Capacity Utilisation	%	22.14%
Average Daily Consumption	l/p/d	53
Resource Abstracted From		Boreholes and Dam
Microbiological Compliance	%	75.00%
Chemical Health Compliance	%	99.99%
Risk Defined Compliance	%	59.62%
VROOM	Rand	-
BDRR 2023	%	59.35%
BDRR 2022	%	42.90%

Introduction

Mantsopa LM is the designated WSA for responsible for the reticulation network of all the WSS. The Excelsior WSS receives 91% water from the Rustfontein WTW and 9% from boreholes, both of which are operated by WSP Bloem Water who is responsible for treatment and bulk network for this WSS. Mantsopa LM is both WSA and WSP and is responsible for treatment and distribution for the remaining four supply systems which receive water from a designated WTW in each supply system.

Regulator's Comments

Mantsopa LM is commended for active participation by various senior managers, including the Technical Director who acknowledged dedication as the Blue Drop Champion who had only recently joined the municipality. The WSA is encouraged to update the existing WaSP to reflect site-specific risks and conduct a water quality risk assessment to identify risk-based determinants that will be included in the monitoring program of each system. Although routine maintenance inspections are conducted at the treatment plant and the network, there is a large number of outstanding maintenance issues for critical equipment at the Genoa WTW. The WSA must ensure there is sufficient budget and trained personnel to implement both reactive and routine maintenance thereby ensuring functionality of water infrastructure.

Compliance monitoring presents a major risk due to data variance and discrepancies between actual records and data uploaded on IRIS. The Regulator is concerned about the low microbiological monitoring compliance, and repeated microbiological failures in the network for Excelsior, Tweespruit and Hobhouse supply systems. These results imply that the water presents a serious health risk to consumers that receive drinking water from these supply systems.

The WSA is commended for capital projects to build new reservoirs to guarantee supply of water, however, the municipality must urgently implement projects to address all performance-limiting risks to ensure the quality of water produced by the treatment plant is safe and does not present health risk to consumers. For the Excelsior system, the Bloem Water team is encouraged to improve their Water Safety Plans to reflect the actual risks on site and to develop and implement risk-based monitoring programs.

A municipality Blue Drop score of 42.28% indicates that water services and water quality is not on par with the expectation of the Regulator. This score marks a decline from the previous Blue Drop score of 52.78% in 2014. The low TSA score is also concerning and confirms that the infrastructure and operations in the field needs urgent attention. The municipality is urged to prioritise the Blue Drop findings listed hereunder and drive a rigorous improvement plan to be ready for the next audit cycle.

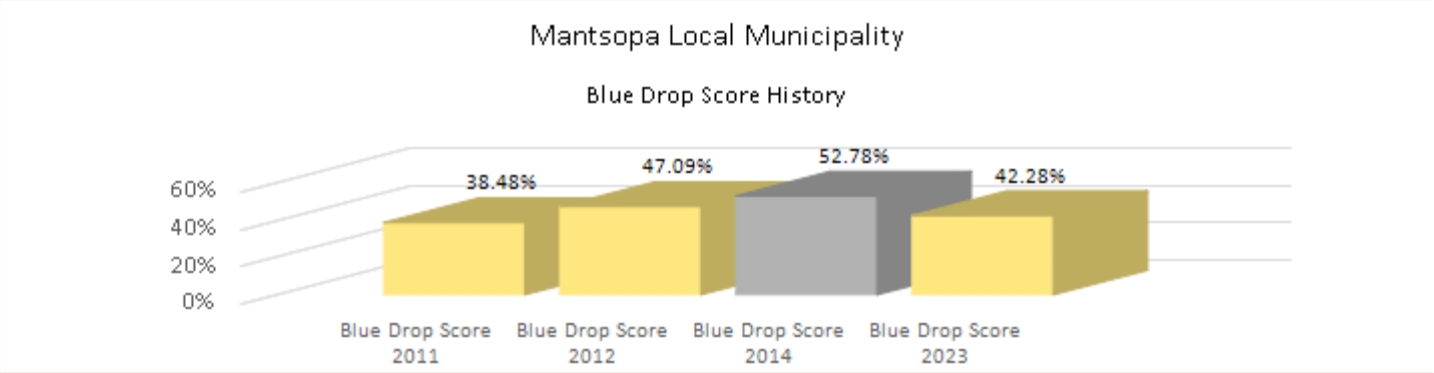
Several capital projects have been secured to address some of the infrastructure gaps:

- Rustfontein, Hobhouse, Ladybrand, Thaba Patchoa & Tweespruit: Installation of water meters R 3 557 499.
- Excelsior system (operated by Bloem Water): R 53 000 000; R189 000 000 for valves, pipes, VSD at high lift pumpstation.
- Ladybrand / Thaba Patchoa: Building of new reservoirs to a value of R 147 000 000.

Blue Drop Findings

The Regulator finds the 5 WSS exhibited similar shortcoming, and summarises the collective recommendations as following:

- Process control staff and operational monitoring is not in place for all WSS except for Excelsior WSS which is operated by Bloem Water.
- Maintenance team qualifications and maintenance records to be improved.
- Water safety plan in place for WSP Bloem Water, however compliance monitoring is not risk-based for the bulk system.
- WSA to assign budget and implement mitigating measures identified in WaSP.
- WSA to develop and implement a risk-based monitoring program aligned with SANS 241 requirements and ensure water quality incidents are identified and mitigated to ensure delivery of safe water at all times.
- Water balances or water loss monitoring and demand management reporting to be refined for reticulation network.



Technical Site Assessment

The ***Genoa WTW*** is operated by the WSA Mantsopa LM and was inspected to verify the Blue Drop audit findings, receiving a technical site score of 36%. The general impression is the WTW is in a critical state and requires urgent attention in terms of maintenance, housekeeping, operations, and process optimisation, to ensure delivery of safe water to consumers.

Refer to the Blue Drop Watch Report 2023 for more detail.

New filter sandbags which have broken open at Genoa WTW

Final water pumpstation filled with mud and water, leaking pipes, no standby pump

Lack of facilities: There are no toilets or bathrooms on site, office and kitchen has broken furniture and old equipment, Kitchen serves as Lab

Chemical dosing room requires refurbishment, only one dosing pump, no bunded walls, no eyewash

Poor staff facilities at Genoa WTW

Final water pump station flooded at Genoa WTW

The Regulator notes the dire state of management and drinking water quality in the Hobhouse, Thaba Phatchoa and Tweespruit water supply systems. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

4.9 Masilonyana Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	25.52%
Blue Drop Score 2014	%	29.64%
Blue Drop Score 2012	%	11.40%
Blue Drop Score 2011	%	6.49%

Key Performance Area	Weight	Brandfort	Theunissen	Verkeerdevlei	Winburg
Bulk/WSP		-	-	-	-
Capacity Management	15%	30.00%	30.00%	20.00%	30.00%
DWQ Risk Management	20%	46.00%	46.00%	46.00%	51.00%
Financial Management	10%	43.00%	43.00%	43.00%	43.00%
Technical Management	20%	15.50%	26.00%	15.50%	15.50%
DWQ Compliance	35%	8.00%	6.00%	6.00%	20.00%
Bonus	10%	0.00%	0.00%	0.00%	0.00%
Penalties	10%	50.00%	50.00%	50.00%	50.00%
Disqualifiers		None	None	None	None
Blue Drop Score 2023	%	**23.90%**	**25.30%**	**21.70%**	**29.10%**
Blue Drop Score 2014	%	27.68%	31.59%	23.85%	31.16%
Blue Drop Score 2012	%	11.31%	10.79%	6.56%	14.91%
Blue Drop Score 2011	%	3.88%	7.08%	4.43%	90.80%
System Design Capacity	kL/d	2 400	6 800	7 348	2 400
System Available Capacity	kL/d	2 400	6 800	7 348	2 400
System Input Value	kL/d	2 500	3 200	1 750	3 200
Capacity Utilisation	%	104.17%	47.06%	23.82%	133.33%
Average Daily Consumption	l/p/d	114	75	493	139
Resource Abstracted From		Erfenis Dam from Sand Vet channel	Erfenis Dam	4 boreholes	Wolwas Dam 1 and 2, Rietfontein Dam
Microbiological Compliance	%	88.89%	61.54%	27.27%	58.33%
Chemical Health Compliance	%	94.03%	97.92%	76.19%	97.80%
Risk Defined Compliance	%	84.72%	67.31%	27.27%	56.25%
VROOM	Rand	-	-	-	**R10 392 000**
BDRR 2023	%	93.46%	82.61%	71.21%	82.06%
BDRR 2022	%	42.80%	86.90%	24.90%	46.70%

Introduction

Masilonyana LM is the WSA and WSP for all supply systems and is responsible for the treatment and distribution of potable water. Each system is supplied by a designated water treatment plant. The Verkeerdevlei WTW has incomplete registration status on IRIS and the design capacity is not aligned with information provided by the WSA: design capacity on IRIS is 7348 kl/d while the design capacity provided in the Master Plan of the WSA is 975 kl/d.

Regulator's Comments

The Regulator finds the overall performance of the municipality to be poor, with a notable lack of information provided for several criteria. There is no information on a maintenance team composition, records of maintenance undertaken, contracts with external service providers, operational monitoring, or daily flow meter readings. The total Municipal budget was provided, indicating that the water budget is not ringfenced.

While there is a draft Water Safety Plan in place, the buy-in by senior management seems to be lacking, with an inadequate budget and resources allocated to implement corrective measures identified for medium and high risks.

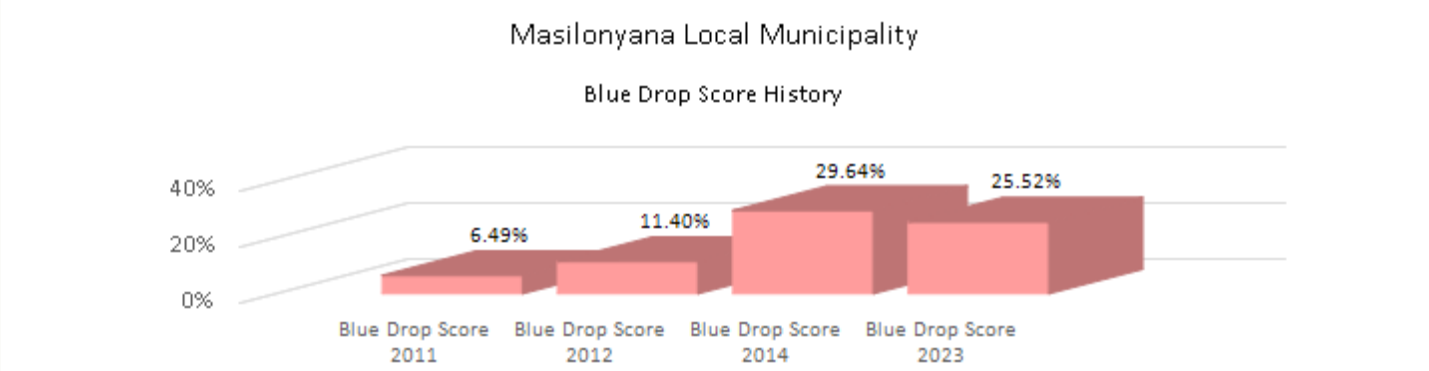
Due to insufficient budget, there are less than 6 months of compliance data. In addition, the results which are available indicate sustained failures for microbiological analysis in all systems and acute chemical health failures in Verkeerdevlei WSS. The WSA must ensure that there is sufficient budget to conduct monthly compliance monitoring aligned with SANS 241 requirements to verify the safety of drinking water. In addition, a water quality incident protocol and register are required to monitor water quality failures, implement corrective actions, and issue Water Quality advisories if required to protect the health of consumers.

No capital budget is available for projects to address the systemic failures and shortcomings that is evident from the municipal Blue Drop score of 25.52% and BDRR scores in high and critical risk positions for all treatment works. The water supply system remains in a critical condition since the BD score of 2014 of 29,64%, with no markable improvement evident over the past 9 years. The Regulator finds this lack of intervention and accountability by senior management and council concerned, as it places the health and wellbeing of the residents and water courses in jeopardy.

Blue Drop Findings

The Regulator finds the 4 WSS exhibited similar shortcoming, and summarises the collective recommendations as follows:

- Registration certificate for Verkeerdevlei to be updated with correct design capacity with supporting POE.
- Process control staff and operational monitoring is not in place for all WSS.
- Maintenance teams qualifications, maintenance schedules and maintenance logbooks are lacking.
- Approved Contracts must be secured for outsourced services which cover maintenance, spares, calibration of meters and supply of chemicals.
- WSA to develop and implement a risk-based monitoring program aligned with SANS 241 requirements and ensure water quality incidents are identified mitigated to ensure delivery of safe water at all times.
- Operational budgets and expenditure systems are in place for the WSA, but this can be refined to provide a detailed budget for water services.
- Annual inspection to be conducted on reticulation network and recommendations implemented as part of Water Safety Planning process.
- Water balances or water loss monitoring and demand management to be undertaken in reticulation network.



Technical Site Assessment

The ***Winburg WTW***, which is operated by the WSA Masilonyana LM, was inspected to verify the Blue Drop audit findings, and received a technical site score of 30%. The general impression is the WTW is in serious need of maintenance, housekeeping, improved operations, and process optimisation to ensure delivery of safe water to consumers.

Refer to the Blue Drop Watch Report 2023 for more details.

Open clear water tank on bottom left-hand side of picture, exposed to contaminants

Terrain is covered with building rubble, old equipment, and huge holes

Chemical dosing facility has one dosing pump, no bunded walls around tanks and room filled with empty chemical drums

Poor state of chemical dosing room at Winburg WTW

Filters in need of urgent upgrade at Winburg WTW

Final water sump is open, no method to control chlorine dosage at Winburg WTW

The Regulator noted the dire state of management and drinking water quality in the Brandfort, Theunissen, Verkeerdevlei and Winburg water supply systems. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

4.10 Matjhabeng Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	55.63%
Blue Drop Score 2014	%	93.60%
Blue Drop Score 2012	%	94.72%
Blue Drop Score 2011	%	79.91%

Key Performance Area	Weight	Allanridge	Heneman	Odendaalsrus	Ventersburg
Bulk/WSP		Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
Capacity Management	15%	69.60%	69.60%	69.60%	69.60%
DWQ Risk Management	20%	52.70%	52.30%	52.30%	52.30%
Financial Management	10%	70.35%	63.95%	67.95%	63.95%
Technical Management	20%	38.50%	38.50%	38.50%	38.50%
DWQ Compliance	35%	52.50%	52.50%	52.50%	54.00%
Bonus	10%	24.00%	24.00%	24.00%	24.00%
Penalties	10%	10.00%	10.00%	10.00%	10.00%
Disqualifiers		None	None	None	None
Blue Drop Score 2023	%	54.89%	54.17%	54.57%	54.70%
Blue Drop Score 2014	%	92.80%	95.10%	92.75%	95.11%
Blue Drop Score 2012	%	95.20%	95.24%	92.05%	95.24%
Blue Drop Score 2011	%	78.70%	80.78%	80.59%	80.80%
System Design Capacity	kL/d	360 000	360 000	360 000	360 000
System Available Capacity	kL/d	360 000	360 000	360 000	360 000
System Input Value	kL/d	3 727	6 100	24 000	1 900
Capacity Utilisation	%	58.33%	58.33%	58.33%	58.33%
Average Daily Consumption	l/p/d	212	244	377	194
Resource Abstracted From		Vaal River	Vaal	Vaal	Vaal River
Microbiological Compliance	%	99.32%	98.87%	99.04%	98.97%
Chemical Health Compliance	%	99.78%	99.90%	99.89%	99.91%
Risk Defined Compliance	%	58.77%	59.03%	59.08%	58.99%
VROOM	Rand	-	-	-	-
BDRR 2023	%	57.82%	57.82%	57.82%	57.82%
BDRR 2022	%	29.70%	30.50%	28.80%	28.33%

Key Performance Area	Weight	Virginia	Welkom
Bulk/WSP		Sedibeng Water	Sedibeng Water
Capacity Management	15%	69.60%	69.60%
DWQ Risk Management	20%	46.30%	52.30%
Financial Management	10%	66.35%	70.35%
Technical Management	20%	47.50%	38.50%
DWQ Compliance	35%	54.50%	56.00%
Bonus	10%	24.00%	24.00%
Penalties	10%	10.00%	10.00%
Disqualifiers		None	None
Blue Drop Score 2023	%	**55.71%**	**56.04%**
Blue Drop Score 2014	%	97.27%	92.54%
Blue Drop Score 2012	%	95.24%	92.24%
Blue Drop Score 2011	%	79.80%	79.63%
System Design Capacity	kL/d	480 000	360 000
System Available Capacity	kL/d	480 000	360 000
System Input Value	kL/d	80 000	78 400
Capacity Utilisation	%	68.33%	58.33%
Average Daily Consumption	l/p/d	1 264	421
Resource Abstracted From		Vaal	Vaal
Microbiological Compliance	%	98.77%	99.13%
Chemical Health Compliance	%	99.83%	99.89%
Risk Defined Compliance	%	58.80%	58.95%
VROOM	Rand	**R120 000 000**	-
BDRR 2023	%	57.98%	57.82%
BDRR 2022	%	28.80%	33.60%

Introduction

All supply systems in Matjhabeng receive water from two water treatment plants operated by WSP Bloem Water (former Sedibeng Water). All supply systems except for Virginia receive water from the Balkfontein WTW which abstracts water from the Vaal River and feeds into an interconnected bulk reticulation network with number of pumpstations and reservoirs that supply multiple water supply systems and multiple WSA`s. The Virginia WSS receives 100% of its potable water from the Virginia WTW which is operated by Bloem Water (former Sedibeng Water). The Balkfontein WTW has a design capacity of 360 000 kl/d and Virginia WTW 480 000 kl/d, of which the full design capacities are available.

Regulator's Comments

The WSA is commended for excellent preparation and presentation of information for the Blue Drop Audit. This demonstrates dedication and commitment to ensure Blue Drop Compliance. The WSA is commended for the outstanding quality of the Water Safety Plan, supported by a comprehensive site-specific risk matrix and detailed record to track implementation of the risk mitigating measures. However, due to financial constraints, there was no compliance monitoring undertaken during the audit period due to non-payment of the service provider, which resulted in the overall lower Blue Drop scores for all supply systems.

Compliance monitoring is critical to verify the safety of drinking water and the WSA must prioritise payment to the accredited laboratory for compliance monitoring. The WSA is encouraged to implement the approved Business Plan for replacement of AC and steel pipes for the whole of Matjhabeng reticulation network. This together with routine maintenance and use of the recently completed GIS system of the reticulation network will ensure continuous delivery of safe water, whilst also reducing water losses.

The WSP Bloem Water (former Sedibeng Water) was also well prepared for the Blue Drop audit and the Regulator acknowledges the team for the excellent routine maintenance schedules and implementation thereof. However, the WSP is encouraged to update their current Water Safety Plan to align with Blue Drop requirements, in particular site-specific risk assessment, water quality assessment and development of risk-based monitoring program. Bloem Water is maintaining good operations of the Balkfontein and Virginia WTW. Both treatment plants have functional treatment processes, competent staff, comprehensive operational monitoring, and excellent O&M capabilities, which include staff, full mechanical, electrical workshop, and stock room with extensive range of spares with a computerised stock control system. However, the WSP is encouraged to update their current water safety plan to align with Blue Drop requirements, in particular site-specific risk assessment, water quality assessment and development of risk-based monitoring program.

There are a few outstanding maintenance issues which have not been addressed since the merger with Bloem Water due to insufficient budget. This is due to lack of payment by Matjhabeng LM and has negatively impacted on operations, monitoring, and reliability of supply. Bloem water must prioritise repairs to critical equipment and ensure there is sufficient budget to maintain the excellent condition and operation of these facilities to ensure they are able to always produce reliable supply of safe water.

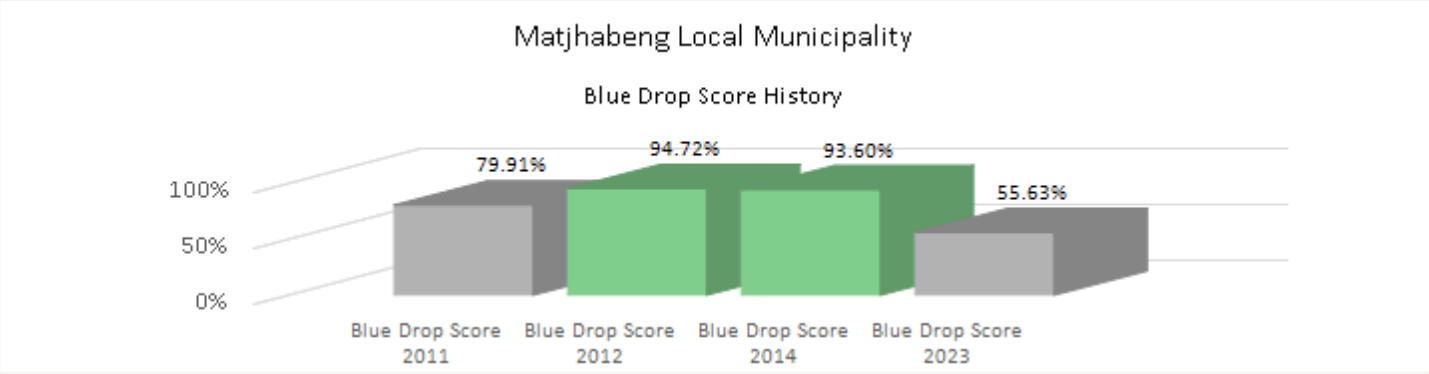
The municipal Blue Drop score of 55.63% indicates that water services are of average standard, leaving room for significant improvement. This Blue Drop score is a significant decline from the 93.6% Blue Drop score in 2014 and the Regulator urges the WSA and WSP to work together to address the gaps as identified from this audit. The following capital budget has been allocated to address some of the shortcomings identified by the municipality:

- Odendaalsrus: R2m for water meters to 400 stands and R32m to replace old, galvanised pipes.
- Welkom: R8m MIG funds to replace Thabong zonal water meters and R26m for housing network connections.

Blue Drop Findings

The Regulator finds the 6 WSS exhibited similar shortcoming, and summarises the collective recommendations as following:

- Process control staff and operational monitoring in place for all WSS.
- The WaSP is in place for both WSA and WSP, however compliance monitoring is not risk-based for WSP Bloem Water.
- WSA to undertake compliance monitoring in network as per SANS 241 requirements to verify the safety of water.
- Operational budgets and expenditure systems are in place but can be refined to reflect on water services.
- Water balances or water loss monitoring and demand management can be improved in reticulation network.
- Penalties applied where water quality is not monitored, and public notices not issued, on the water distribution networks after handover from WSP to WSA.



Technical Site Assessment

The ***Balkfontein WTW*** and the ***Virginia WTW*** were inspected to verify the Blue Drop audit findings and received a technical site score of 82% (Balkfontein) and 88% (Virginia) respectively. The general impression of both WTW is excellent as both treatment plants have functional treatment processes, competent staff, comprehensive operational monitoring, and excellent O&M capabilities. The potable water produced by both treatment plants complies with microbiological limits.

Refer to the Blue Drop Watch Report 2023 for more detail.

Final water pumpstation at Balkfontein WTW

SCADA system at Balkfontein WTW

Excellent monitoring equipment at Balkfontein WTW

Matjhabeng high lift tower

Final water pumpstation at Virginia WTW

Sedimentation tanks at Balkfontein WTW

4.11 Metsimaholo Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	84.21%
Blue Drop Score 2014	%	84.52%
Blue Drop Score 2012	%	89.49%
Blue Drop Score 2011	%	48.86%

Key Performance Area	Weight	Deneysville	Oranjeville	Sasolburg
Bulk/WSP		-	-	Rand Water
Capacity Management	15%	43.00%	43.00%	85.20%
DWQ Risk Management	20%	52.50%	52.50%	86.60%
Financial Management	10%	31.25%	31.25%	68.75%
Technical Management	20%	24.50%	36.50%	74.00%
DWQ Compliance	35%	67.50%	76.50%	95.00%
Bonus	10%	50.00%	50.00%	87.00%
Penalties	10%	0.00%	0.00%	0.00%
Disqualifiers		None	None	None
Blue Drop Score 2023	%	53.60%	57.90%	89.38%
Blue Drop Score 2014	%	72.57%	68.88%	89.11%
Blue Drop Score 2012	%	82.06%	79.81%	94.18%
Blue Drop Score 2011	%	57.68%	58.10%	43.06%
System Design Capacity	kL/d	9 900	2 590	5 427 000
System Available Capacity	kL/d	9 900	2 590	5 427 000
System Input Value	kL/d	5 500	1 800	41 771
Capacity Utilisation	%	55.56%	69.50%	78.49%
Average Daily Consumption	l/p/d	225	449	346
Resource Abstracted From		Vaal Dam	Vaal Dam	Vaal Dam
Microbiological Compliance	%	98.78%	99.99%	99.90%
Chemical Health Compliance	%	99.99%	99.99%	99.99%
Risk Defined Compliance	%	84.82%	93.62%	99.28%
VROOM	Rand	R606 098	-	R12 831 504
BDRR 2023	%	43.40%	43.40%	30.18%
BDRR 2022	%	40.20%	39.00%	26.00%

Introduction

The water business of the local municipality serves approximately 150 000 people via three water supply systems. The MLM is responsible for supplying on average SIV of 7 300 kL of water per day. The Sasolburg system receives water in bulk from Rand Water, supplying the towns Sasolburg, Zamdela and Kragbron. The combined design capacity of the two WTWs is 12 490 kL/d, augmented by 42 000 kL/d from Rand Water.

Regulator's Comments

The Metsimaholo LM was well prepared for the audit with several of the supporting documents uploaded onto IRIS. These were complemented with hard copies during the assessment.

WaSPs are available for all three systems and although risks are identified proof of the implementation of mitigation plans were not available. Unfortunately, the Deneysville WTW was not assessed / audited during the period under the review. The Deneysville WTW consists of the old 4.8 ML/d plant and a new 5.1 ML/d package plant which is only used during high demand periods. The Oranjeville WTW is being upgraded with phase 1 of the project already finalised. Rand Water provides water of excellent quality to 80% of the population within the municipality and contributes significantly to the 89.4% BD score of the Sasolburg system.

The MLM is commended for complying with the WQ limits of SANS241. However, the number of sample points as well as the chemical determinants monitored do not comply with the minimum requirements. A full SANS was also not conducted and the MLM misses the opportunity of Risk-based monitoring.

The MLM makes use of both a term contract and internal staff to perform maintenance with a plan for preventative maintenance. Interaction between the Technical and Finance departments within the MLM underlies poor financial management performance. The financial information supplied is not sufficient for DWS to fully understand the cost of supplying drinking water within MLM. The overall municipal BD score of 84.21% compares well to 84.52% in 2014. However, the Regulator is concerned that Deneysville and Oranjeville systems regressed from 70% to below 60% since the 2014 assessment and request the municipality to identify and correct the contributing factors.

CAPEX projects for the drinking water business includes:

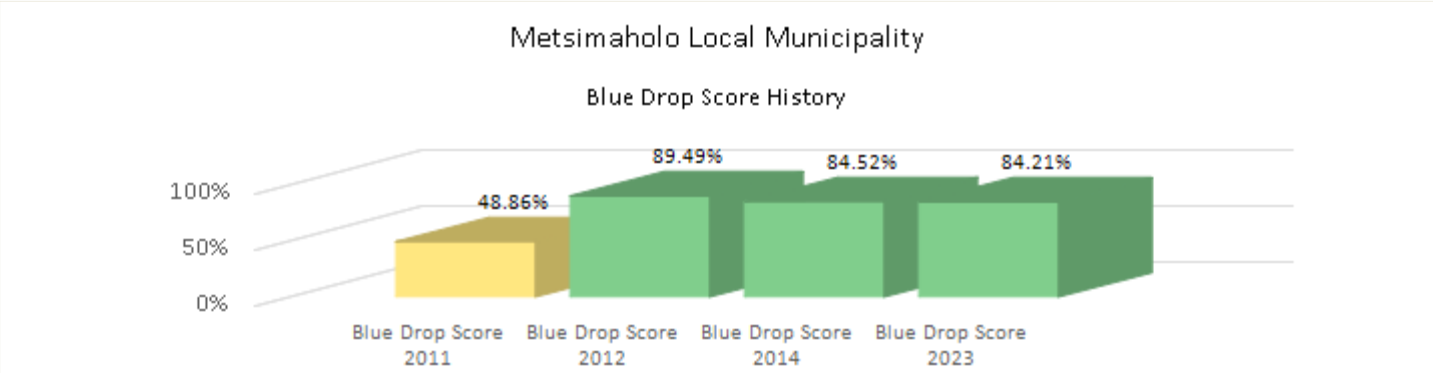
- Replacement of AC galvanised water pipes in the water network – R11,332,010
- Water pump and water pump engine replacements – R250,000
- 7kVA petrol generator – R50,000
- Isolation valves and portable floodlights – R250,000
- Residential water meters and pre-paid meters – R6,250,000
- Installation of water lines in unserved stands – R400,000
- LD Vehicles and a canopy – R610,000.

Blue Drop Findings

- The requirements of Regulation 813 should be considered with the employment of process controllers.
- The technical department should take ownership of the assets, assess the condition thereof and maintain it.
- Water quality monitoring programs should be expanded to prove safe drinking water. The Deneysville laboratory should also consider taking part in PTS to prove the credibility of the WQ results.
- Process audits/Condition assessments for both the WTWs should be done annually.
- No reticulation inspection report for any of the systems informs the municipality of any risks that compromise service delivery and should be included considered by the municipality.

The per capita water usage for both Oranjeville and Sasolburg is very poor with the potential of a marked improvement by implementing water conservation and demand management.

Blue Drop Risk Ratio: A BDRR of 43.4% summarises the state of the drinking water business of the MLM.



Technical Site Assessment

The Deneysville water treatment works was inspected to assess the condition and functionality of infrastructure and treatment processes on the ground, and to estimate the cost of restoration to full functionality. The Deneysville water treatment works is in a fair condition and received a 73% TSA score.

Refer to the Blue Drop Watch Report 2023 for more detail.

Deneysville WTW: Clarification

Deneysville WTW: Filter backwashing

Deneysville WTW: Dysfunctional chloring dosing facility

4.12 Mohokare Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	27.58%
Blue Drop Score 2014	%	65.30%
Blue Drop Score 2012	%	77.04%
Blue Drop Score 2011	%	80.10%

Key Performance Area	Weight	Rouxville Conventional Water Treatment Plant 	Smithfield Conventional Water Treatment Plant 	Zastron Conventional Water Treatment Plant 
Bulk/WSP		-	-	-
Capacity Management	15%	38.00%	38.00%	38.00%
DWQ Risk Management	20%	38.50%	38.50%	45.00%
Financial Management	10%	69.25%	64.00%	69.25%
Technical Management	20%	15.50%	7.50%	24.50%
DWQ Compliance	35%	25.00%	25.00%	25.00%
Bonus	10%	0.00%	0.00%	0.00%
Penalties	10%	50.00%	50.00%	50.00%
Disqualifiers		None	None	None
Blue Drop Score 2023	%	27.18%	25.05%	30.28%
Blue Drop Score 2014	%	67.17%	62.65%	65.62%
Blue Drop Score 2012	%	65.63%	82.97%	79.80%
Blue Drop Score 2011	%	80.38%	79.47%	80.28%
System Design Capacity	kL/d	2 880	3 220	3 024
System Available Capacity	kL/d	2 880	3 220	3 024
System Input Value	kL/d	1 769	2 200	2 327
Capacity Utilisation	%	61.42%	68.32%	76.98%
Average Daily Consumption	l/p/d	177	220	129
Resource Abstracted From		Kalkoenskraal Dam	Caledon River	Montague River
Microbiological Compliance	%	63.13%	69.75%	67.09%
Chemical Health Compliance	%	99.75%	99.76%	99.99%
Risk Defined Compliance	%	63.13%	69.75%	67.09%
VROOM	Rand	-	-	R5 443 200
BDRR 2023	%	52.14%	47.80%	36.95%
BDRR 2022	%	39.00%	37.80%	52.50%

Introduction

Mohokare LM is the WSA and WSP for all supply systems and is responsible for treatment and distribution of potable water.

Regulator's Comments

The Mohokare LM is commended for deploying a multi-disciplinary team to participate in the Blue Drop audit, including the Municipal Manager, CFO, PMU Manager, and Technical Director. Active engagement by the Mohokare team indicates dedication to improve its overall Blue Drop compliance.

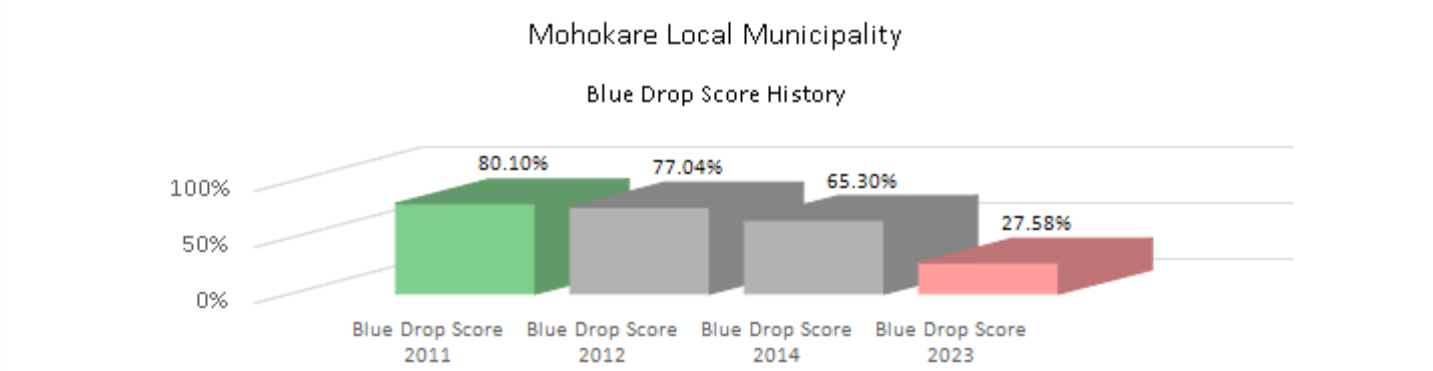
At the present time, water services are in a poor state as is evident by lack of maintenance (skilled personnel, routine maintenance, contracts with service providers, reporting systems), lack of Water Safety Plans and water quality incident registers, compounded by inadequate monthly compliance monitoring which is reportedly due to insufficient budget. The WSA is encouraged to adopt the proposed organogram and ensure there is a sufficient number of qualified personnel to fill relevant positions within the water services division. All three water supply systems do not comply with microbiological requirements, which implies that the water is not safe for human consumption. No Adverse Water Quality Notices are communicated to the water users to inform them of the poor state of water quality, which attracted a penalty. Mohokare is urged to conduct a process audit or detailed condition/process assessment and network inspection to identify and mitigate shortcomings in the treatment process and distribution network. In addition, procurement of operational monitoring equipment and training process controllers on how to use equipment to optimise the treatment process will ensure delivery of safe water in the future. The Blue Drop score of 27.58% marks a steep decline from the previous Blue Drop score of 65.30% in 2014. The following capital projects are confirmed to address some of the gaps identified:

- Upgrading of 27 km pipeline from the Orange River to the value of R112,000,000 (Rouxville WSS)
- Construction of abstraction works to the value of R39,000,000 (Rouxville WSS)
- Upgrade of the Rouxville WTW to a value of R59,000,000.
- Upgrade of the Smithfield WTW Phase 1 to a total value of R38,000,000.
- Refurbishment of the Zastron WTW to the value of R2,100,000.

Blue Drop Findings

The Regulator finds the 3 WSS exhibited similar shortcoming, and summarises the collective recommendations as following:

- Process control staff and operational monitoring is not in place for all WSS.
- Maintenance teams qualifications, maintenance schedules and maintenance logbooks are lacking.
- Approved Contracts must be secured for outsourced services which cover maintenance, spares, calibration of meters and supply of chemicals.
- WSA to implement Water Safety planning and risk-based monitoring program aligned with SANS 241 requirements to ensure delivery of safe water at all times.
- Operational budgets and expenditure systems are in place but can be refined to reflect actual cost drivers including raw water cost.
- Water balances or water loss monitoring and demand management to be undertaken in reticulation network.



Technical Site Assessment

The ***Zastron WTW*** is operated by the municipality and was inspected to verify the Blue Drop audit findings, receiving a technical site score of 40%. The general impression is that the WTW requires routine maintenance, effective operations with daily monitoring, and suitable staff facilities such as toilets and bathrooms. The potable water produced by the treatment plant does not comply with microbiological limits and presents health risks to consumers.

Refer to the Blue Drop Watch Report 2023 for more details

Sludge drying beds filled with sludge and weeds at Zastron WTW

Chemical storage unit filled with rain and mud at Zastron WTW

Clear water wells are uncovered to allow tankers to collect water at Zastron WTW

The Regulator notes the dire state of management and drinking water quality in the Rouxville, Smithfield and Zastron water supply systems. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

4.13 Moqhaka Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	36.12%
Blue Drop Score 2014	%	60.16%
Blue Drop Score 2012	%	54.93%
Blue Drop Score 2011	%	21.76%

Key Performance Area	Weight	Kroonstad	Steynsrus	Viljoenskroon
Bulk/WSP		-	-	-
Capacity Management	15%	58.00%	48.00%	58.00%
DWQ Risk Management	20%	23.00%	31.00%	61.00%
Financial Management	10%	8.00%	8.00%	8.00%
Technical Management	20%	33.50%	0.00%	18.00%
DWQ Compliance	35%	47.50%	47.50%	47.50%
Bonus	10%	10.00%	12.50%	12.50%
Penalties	10%	25.00%	25.00%	35.00%
Disqualifiers		None	None	None
Blue Drop Score 2023	%	35.93%	29.58%	39.68%
Blue Drop Score 2014	%	59.81%	49.22%	65.00%
Blue Drop Score 2012	%	57.55%	37.86%	38.10%
Blue Drop Score 2011	%	20.91%	16.35%	31.51%
System Design Capacity	kL/d	60 000	2 900	6 900
System Available Capacity	kL/d	38 000	2 000	6 900
System Input Value	kL/d	29 104	2 900	6 900
Capacity Utilisation	%	76.59%	100.00%	NI
Average Daily Consumption	l/p/d	298	318	219
Resource Abstracted From		Vals River	Vals River	Renoster and Vaal Rivers
Microbiological Compliance	%	72.35%	71.93%	62.18%
Chemical Health Compliance	%	99.99%	99.75%	99.99%
Risk Defined Compliance	%	77.29%	78.33%	76.76%
VROOM	Rand	-	-	R5 382 000
BDRR 2023	%	33.04%	38.24%	46.61%
BDRR 2022	%	65.90%	48.30%	48.30%

Introduction

The Moqhaka Local Municipality, with their main office situated in the town of Kroonstad, is responsible for the water supply to Viljoenskroon, Steynsrus and Kroonstad. The municipality has no bulk water suppliers providing potable water to them. The total design capacity of the three treatment plants is 69 800 kL/d, and the system input volume supplies is 38 904 kL/day.

Regulator's Comments

The audit team was heartily welcomed to the site inspection and the municipal team engaged deeply with the process. Information was readily available and well explained to motivate for positive audit scoring against each KPA. Moqhaka acknowledged that some information was still not available, and that the credibility of data needs to receive attention during the next audit cycle. All water supply systems indicated some form of equipment failures and faults which impact on the supply and quality of drinking water to the consumers. The bulk metering equipment was broken and inaccurate, as was evident from the lack of calibration or repair of meters. Not being able to measure equates to not being able to manage the plants according to its design specifications.

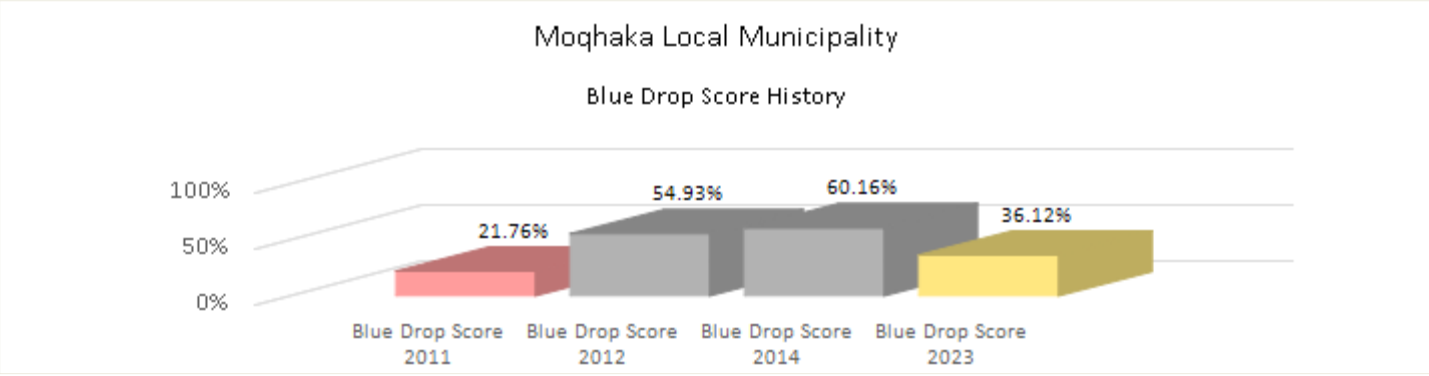
Blue Drop Findings

The Regulator is concerned about the absence or faulty operational equipment for the analysis of water quality, i.e., pH, EC, and turbidity instrumentation. Process control and compliance cannot be achieved without these tools, as was further evident from the incomplete operational logbooks. The Process Controller capacity within the Municipality is adequate and could be improved by balancing out the approved Process Controllers across the three plants. Process audits were done by an external service provider at two of the three systems, but not used to inform the legislated Water Safety Planning process. Risk-based planning will ensure that this process audit findings inform corrective measures for a compliance monitoring program, as well as refurbishment and upgrade programs which may be used to motivate for funding via the municipal water and sanitation master plans. A more active role of the engineering officials in the presentation of financial, asset and budget information will secure an improved score against KPA 3. The audit team found gaps in evidence related to system specific costs, tariffs, monitoring of expenditure and capital funding. At time of the audit, all financials were reliant on the finance department, whose focus is compliance with the MFMA and other treasury regulations. The involvement of financial officials in meeting Blue Drop targets would go a long way to improve the municipal Blue Drop score.

The process audit and condition assessment of the treatment works, and distribution network are critical to gain an understanding of the maintenance, operational and financial resources required. The municipality did not have a comprehensive view of the number of pump stations, reservoirs, bulk distribution pipe lengths and reticulation pipework, to ensure that the intricacies and complexities of the technical plant and equipment is properly scoped, planned and attended to. Confirming the status and magnitude of infrastructure will enable the municipality to work its way towards drinking water compliance. SANS 241 compliance was not achieved for the audit year in question, and alarmingly, no Alert Notices were issued to the communities regarding the drinking water quality.

No specific Capital budget for the assessment period was provided.

An overall municipal Blue Drop score of 36.12% indicates that significant improvement still needs to be attained to ensure safe drinking water to the communities of Moqhaka. The Regulator is concerned about the digress in performance since the last Blue Drop audit in 2014, whereby the municipality obtained a decent 60.16% score. Furthermore, no capital funds appear to be available to address the infrastructural needs for water supply and treatment. The moderate TSA score of 62% coupled with reasonable BDRR risk scores for two of the three treatment facilities gives hope that the municipality will be able to turn around water services delivery to meet compliance and good practice standards.



Technical Site Assessment

The **Viljoenskroon Water Treatment Works** obtained a TSA score of 62% and was found to be reasonably maintained with functional treatment processes and competent staff. Water quality is monitored according to SANS 241. No Directives have been issued by the Regulator.

The raw water abstraction infrastructure is at risk of flooding and the necessary redesign / reconfiguration of this infrastructure needs to be done. A Water Safety Plan is in place but needs more in-depth analysis of water quality risks need assessment for implementation.

Refer to the Blue Drop Watch Report 2023 for more detail.

Final water outlet valve and meter (not working)

Raw water pump station at river, no standby

Old settling tank still being used

The Regulator notes the dire state of management and drinking water quality in the Steynsrus water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

4.14 Nala Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	52.30%
Blue Drop Score 2014	%	81.29%
Blue Drop Score 2012	%	67.23%
Blue Drop Score 2011	%	58.90%

Key Performance Area	Weight	Balkfontein (Sedibeng Water)
Bulk/WSP		Sedibeng Water
Capacity Management	15%	64.00%
DWQ Risk Management	20%	53.90%
Financial Management	10%	59.35%
Technical Management	20%	29.00%
DWQ Compliance	35%	57.10%
Bonus	10%	24.00%
Penalties	10%	16.00%
Disqualifiers		None
Blue Drop Score 2023	%	52.30%
Blue Drop Score 2014	%	81.36%
Blue Drop Score 2012	%	67.23%
Blue Drop Score 2011	%	58.90%
System Design Capacity	kL/d	360 000
System Available Capacity	kL/d	360 000
System Input Value	kL/d	14 631
Capacity Utilisation	%	58.33%
Average Daily Consumption	l/p/d	140
Resource Abstracted From		Vaal
Microbiological Compliance	%	97.39%
Chemical Health Compliance	%	99.71%
Risk Defined Compliance	%	96.87%
VROOM	Rand	-
BDRR 2023	%	43.57%
BDRR 2022	%	45.60%

Introduction

The Nala Local municipality receives water from the Balkfontein WTW which is operated by Bloem Water (former Sedibeng Water), with a design capacity of 360 000 kl/day. The SIV for the system is 14 631 kl/d and this water is delivered to two reservoirs namely Wesselsbron and Bothaville. Both reservoirs are operated by WSP Bloem Water.

Regulator's Comments

The WSA is facing challenges with regards to O&M of the reticulation network due to lack of skilled personnel, maintenance records, a routine maintenance program and annual reticulation inspection. In addition, Water safety planning is not implemented and there is no incident protocol to deal with water quality failures in the network. The Regulator is concerned about the lack of commitment from management to drive Blue Drop compliance, as is evident by the lack of information presented and uploaded on IRIS, lack of participation by finance department and lack of participation in the confirmation session.

Microbiological compliance in distribution network is 94% and there are no chemical monitoring results. There is no record of water quality incidents to show if resampling and implementation of mitigating measures were affected to resolve failures. No Adverse Water Quality Notices have been issued to communicate confirmed or possible water quality failures to the water users of Nala. As such, the water quality in Nala LM cannot be guaranteed and presents a health risk to consumers.

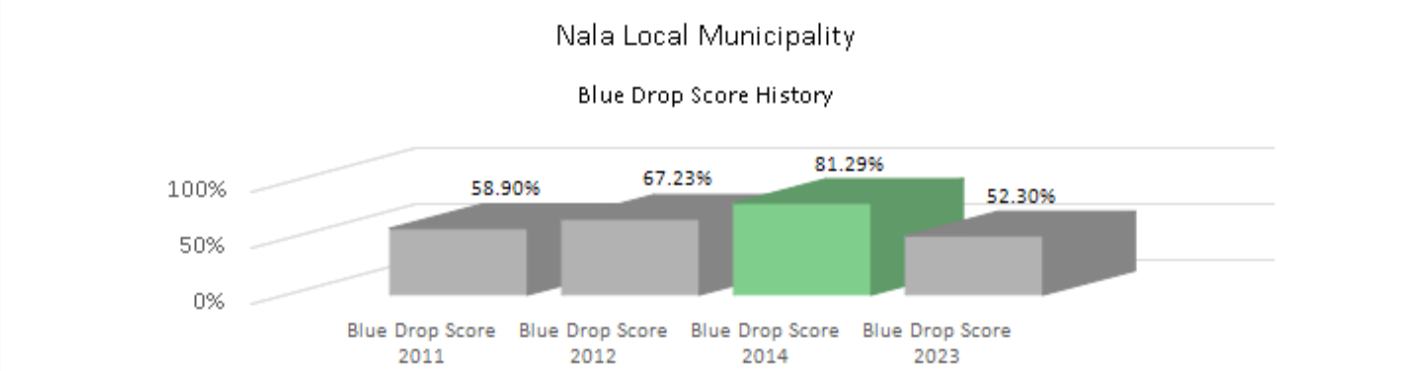
The WSP Bloem Water (former Sedibeng Water) was well prepared for the Blue Drop Audit and acknowledged for an excellent maintenance team and routine maintenance schedules. However, WSP is encouraged to update their current water safety plan to align with Blue Drop requirements, in particular site-specific risk assessment, water quality assessment and development of risk-based monitoring program.

The Blue Drop score of 52.30% indicates an overall average performance for Nala municipality, noting that the good WSP performance contributed significantly to this positive score. The 2023 Blue Drop score shows a significant decline from the 81.4% BD score of 2014. The BDRR of 45.57% places the water treatment works in an average risk position.

Blue Drop Findings

The Regulator summarises the collective recommendations as following:

- Process control staff and operational monitoring in place for all WSS.
- Routine maintenance is required for the reticulation network with maintenance records and incident register for water quality failure.
- Water Safety plan in place for WSP, however compliance monitoring is not risk-based.
- Lack of Water safety plan and risk-based monitoring program in the reticulation network.
- WSA to undertake monthly compliance monitoring in network as per SANS 241 requirements and implement mitigating measures in the event of failures in the network to ensure delivery of safe water.
- Operational budgets and expenditure are not in place, budget lacks key cost drivers including raw water cost, compensation, energy cost, and chemical cost.
- WSA to ensure asset register to include condition, remaining useful life and replacement value; and used to inform Maintenance Plan.
- Water balances or water loss monitoring and demand management is not taking place in the reticulation network



Technical Site Assessment

The ***Balkfontein WTW*** was inspected to verify the Blue Drop audit findings and received a technical site score of 82%. The general impression is that the WTW is operating well, with functional treatment processes, competent staff, comprehensive operational monitoring, and excellent O&M capabilities. The potable water produced by the treatment plant complies with microbiological limits.

Refer to the Blue Drop Watch Report 2023 for more detail.

Jar Tests conducted regularly at Balkfontein WTW

Excellent stock of spares at Balkfontein WTW

Sedimentation tanks at Balkfontein WTW

4.15 Ngwathe Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	36.16%
Blue Drop Score 2014	%	55.43%
Blue Drop Score 2012	%	20.59%
Blue Drop Score 2011	%	45.37%

Key Performance Area	Weight	Parys	Vredefort	Koppies	Edenville (Boreholes)
Bulk/WSP		-	-	-	-
Capacity Management	15%	40.00%	30.00%	20.00%	20.00%
DWQ Risk Management	20%	33.50%	21.00%	21.00%	25.00%
Financial Management	10%	40.25%	40.25%	40.25%	40.25%
Technical Management	20%	15.50%	15.50%	15.50%	7.50%
DWQ Compliance	35%	0.00%	0.00%	0.00%	0.00%
Bonus	10%	27.50%	13.75%	7.50%	5.00%
Penalties	10%	50.00%	50.00%	50.00%	50.00%
Disqualifiers		None	None	None	None
Blue Drop Score 2023	%	22.58%	17.20%	15.08%	14.03%
Blue Drop Score 2014	%	53.14%	35.71%	53.75%	45.84%
Blue Drop Score 2012	%	14.33%	11.20%	11.00%	20.50%
Blue Drop Score 2011	%	39.55%	37.86%	24.11%	23.89%
System Design Capacity	kL/d	25 000	3 700	3 800	384
System Available Capacity	kL/d	13 125	3 600	4 200	400
System Input Value	kL/d	15 000	3 600	4 200	188
Capacity Utilisation	%	114.29%	100.00%	100.00%	47.00%
Average Daily Consumption	l/p/d	293	194	297	23
Resource Abstracted From		Vaal River	Vaal River	Renoster River	Groundwater
Microbiological Compliance	%	0.00%	0.00%	0.00%	0.00%
Chemical Health Compliance	%	0.00%	0.00%	0.00%	0.00%
Risk Defined Compliance	%	0.00%	0.00%	0.00%	0.00%
VROOM	Rand	R33 119 900	-	-	-
BDRR 2023	%	82.69%	86.06%	93.56%	91.90%
BDRR 2022	%	81.40%	84.70%	88.10%	92.00%

Key Performance Area	Weight	Heilbron
Bulk/WSP		Rand Water
Capacity Management	15%	76.00%
DWQ Risk Management	20%	78.00%
Financial Management	10%	70.75%
Technical Management	20%	74.00%
DWQ Compliance	35%	80.00%
Bonus	10%	78.00%
Penalties	10%	10.00%
Disqualifiers		None
Blue Drop Score 2023	%	**81.73%**
Blue Drop Score 2014	%	77.84%
Blue Drop Score 2012	%	54.73%
Blue Drop Score 2011	%	68.45%
System Design Capacity	kL/d	5 427 000
System Available Capacity	kL/d	5 427 000
System Input Value	kL/d	8 000
Capacity Utilisation	%	78.49%
Average Daily Consumption	l/p/d	391
Resource Abstracted From		Vaal Dam
Microbiological Compliance	%	99.93%
Chemical Health Compliance	%	99.99%
Risk Defined Compliance	%	98.86%
VROOM	Rand	**R12 831 504**
BDRR 2023	%	42.31%
BDRR 2022	%	36.70%

Introduction

The water business of the Ngwathe Local Municipality serves approximately 112 500 people. This is based on the latest number of households in the IDP with an average of 3.2 people per household. The combined design capacity of the WTWs is 35 200 kL/d with the average daily SIV of 23 000 kL/d augmented by 8 000 kL/d from Rand Water. The Edenville system has 25 boreholes with only 13 in use due to the unacceptable quality water of the remaining boreholes. The WSI is considering a pipeline from Heilbron to feed into Edenville (Rand Water as bulk supplier). The feasibility of this project was not known at time of assessment.

Regulator's Comments

The WSI was poorly prepared for the Blue Drop audit with most of the evidence not available or uploaded to IRIS. The Ngwathe LM made limited documents available during the assessment. No Water Quality compliance data is available for 4 of the 5 systems. Heilbron receives water from Rand Water and only the bulk monitoring results are submitted to IRIS. The WSI did not attend the confirmation session, which was then rescheduled to a date and time requested by the WSI. The meeting was kept open for 60 minutes, but none of the WSI representatives joined the meeting. The Regulator notes this to be disrespectful to the time of the auditors and a display of unprofessionalism. The lack of accountability and leadership is concerning and one of the root causes of the ongoing problems and unrest reported for the towns.

The Blue Drop score of the Heilbron system improves from 77.8% in 2014 to the current 81.5%. This higher score is mostly as result of the Rand Water involvement in the Heilbron system. The other systems operated by the municipality scored in the range of 14 to 23%, which renders them all in critical state. The resultant overall municipal Blue Drop score of 36.16% shows a steep regress against the 55.43% obtained in 2014.

The WSI is positively engaged to have all PCs registered and classified on IRIS. Twelve of the PCs employed by the WSI attended some form of training in the 24 months prior to the assessment. DWS applaud this positive development within the WSI. Of concern is the lack of performance agreements on senior- and municipal management level. Such performance should relate to SANS241 compliance as key driver of accountability. The lack of compliance monitoring is one critical element of management not adhering to legislative norms, coupled with the lack of issuing drinking water notices to the public where water quality is unknown or of poor quality.

Budget information was provided, with three of the five cost drivers included in the budget information supplied. The NLM is encouraged to include raw water and employee costs in their water business financials. The expenditure amounts supplied in the O&M is only half the budgeted amount - this lack of funding coupled with the lack of maintenance plans and skilled staff, is reflected in the low BD scores and TSA score. It is concerning that technical management could not verify their qualifications to give the public reassurance of the competency to deliver safe drinking water quality to the communities in the area. Only one SCM contract is available for the supply of treatment chemicals, with no contracts for spare parts, maintenance and other goods or services. No information was made available on capital budget and expenditure. The asset register was supplied as a soft copy during the assessment, but not uploaded onto IRIS.

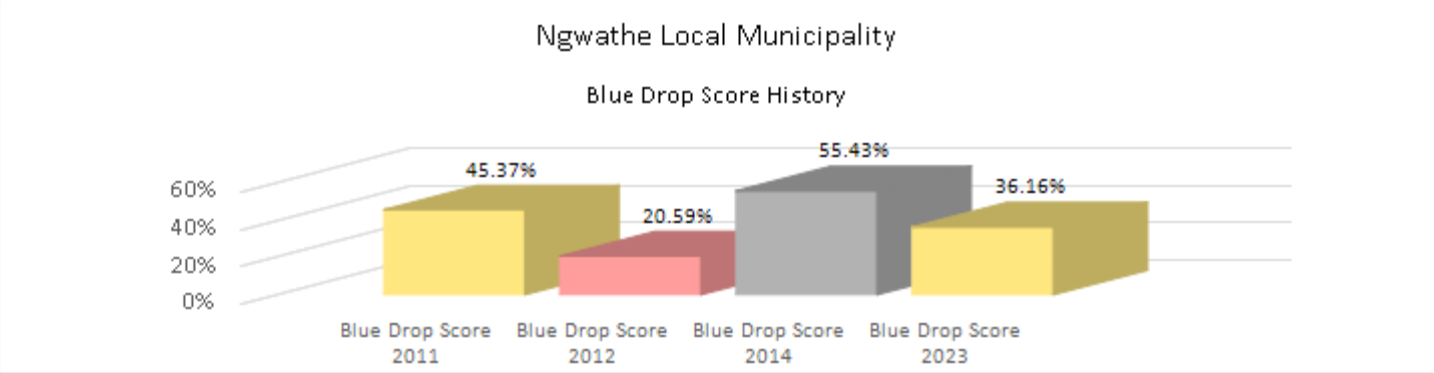
Ngwathe fails to deliver drinking water to 40% of its customers, with further evidence that of interrupted water supply for extended period prior to publishing of this report. Water usage per capita ranges from 23 L/p/d (Edenville) to 391 L/p/d (Heilbron). Except for Edenville, all systems within the Ngwathe LM have the potential to improve water supply by repairing and limiting water leakages, replacing the remaining asbestos pipelines in the distribution systems, and implementing demand and conservation management. However, these interventions would require resources in terms of budget and qualified/skilled personnel. The BDRR of more than 80% summarises the state of the drinking water business of the municipality, indicating that the water services business is in a critical state and poses a risk to all consumers within the reach of this supply system. The Regulator expresses its deep concern on the dysfunctional state of water services in the municipal area, and the lack of leadership and senior management interventions to address the continued water quality issues, coupled with the negative media coverage regarding cholera outbreaks, sewage spillage upstream of the water treatment plants in Parys and Vredefort, and the interrupted water supply to the residents, schools, and businesses of these towns.

A separate report is available on the regulatory comments pertaining to the bulk water supplier (Rand Water) to the Heilbron system.

Blue Drop Findings

The following notes reflect on the WSA. In the case of the Heilbron supply system, it contributes 40% to the overall score with the remaining 60% contributed by the assessment of Rand Water as bulk supplier:

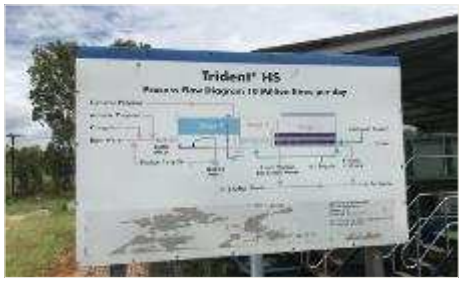
- WTWs and process controllers are registered and classified on IRIS but not all of PC comply to regulations and some of the WTWs operate without a qualified supervisor.
- Maintenance is done by an internal team only, and not according to a plan or schedule, with only reactive maintenance taking place.
- The NLM does not employ engineering staff and seems to contract services as and when required. No evidence was provided of any scientific backup to ensure the testing or provision of safe drinking water.
- The Water Master Plan and Water Safety Plan both was compiled in 2017 and was not reviewed during the year of assessment. An updated risk register was provided but proof of implementation of mitigation measures was limited.
- No IMP and compliance monitoring programs were in place; this is a critical shortcoming and places the lives of people and public infrastructure at risk.
- No evidence of an annual process audit and reticulation inspection report was presented.
- Design capacities and technical data could not be verified.
- Flow data and calibration / verification information on flow meters were not available. During the technical site inspection of the Parys WTW, the senior PC informed the team that pump hours are used to estimate flows. No interpretation of these statistics was observed to inform longer term planning for upgrades or refurbishment.
- The NLM could not provide evidence of the implementation of any operational or compliance monitoring program and no water quality results are available. Credible laboratory services were absent.
- Penalties were applied for the non-issuing of notices to the public to alert water users of water quality failures or lack of monitoring of critical microbiological and chemical constituents.



Technical Site Assessment

The ***Parys WTW*** received a TSA score of 36% and was found to be in an advanced state of neglect and in need of refurbishment and maintenance. Less than 60% of the installed capacity at the WTW is currently available to treat water, compromising both the quantity and quality of the water. Both the sand filtration and chlorination units are dysfunctional.

Refer to the BD Watch report 2023 for detailed information.



The 10 ML/d package plant not in use during the site visit to the Parys WTW

A well-equipped laboratory not in use at the Parys WTW

Chemical dosing area of the new WTW at Parys

The Regulator notes the dire state of management and drinking water quality in the Parys, Vredefort, Koppies and Edenville (Boreholes)water supply systems. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

4.16 Nketoana Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	45.60%
Blue Drop Score 2014	%	71.40%
Blue Drop Score 2012	%	18.57%
Blue Drop Score 2011	%	6.33%

Key Performance Area	Weight	Reitz	Lindley	Arlington	Petrus Steyn
Bulk/WSP		-	-	-	-
Capacity Management	15%	62.00%	65.00%	65.00%	62.00%
DWQ Risk Management	20%	29.50%	35.00%	35.00%	32.50%
Financial Management	10%	46.75%	36.75%	49.25%	31.50%
Technical Management	20%	23.75%	31.75%	31.75%	23.75%
DWQ Compliance	35%	52.50%	72.00%	78.00%	60.00%
Bonus	10%	5.00%	5.00%	5.00%	5.00%
Penalties	10%	0.00%	0.00%	0.00%	0.00%
Disqualifiers		None	None	None	None
Blue Drop Score 2023	%	**43.50%**	**52.35%**	**55.70%**	**45.20%**
Blue Drop Score 2014	%	71.49%	68.42%	66.99%	81.78%
Blue Drop Score 2012	%	19.74%	15.43%	13.60%	18.16%
Blue Drop Score 2011	%	4.77%	10.22%	5.04%	5.31%
System Design Capacity	kL/d	15 000	4 000	2 000	1 000
System Available Capacity	kL/d	11 000	3 500	2 000	1 000
System Input Value	kL/d	11 000	2 700	500	500
Capacity Utilisation	%	NI	77.14%	25.00%	50.00%
Average Daily Consumption	l/p/d	308	150	63	33
Resource Abstracted From		Liebenbergsvlei	Vals	Hamanspruit	Kaloemspruit
Microbiological Compliance	%	96.47%	99.99%	99.99%	99.99%
Chemical Health Compliance	%	99.99%	99.99%	99.99%	99.99%
Risk Defined Compliance	%	91.45%	94.27%	96.30%	88.26%
VROOM	Rand	**R67 500 000**	-	-	-
BDRR 2023	%	53.36%	26.72%	19.43%	26.59%
BDRR 2022	%	48.51%	37.34%	29.60%	52.53%

Introduction

Nketoana LM is responsible for the water supply to the following communities, Reitz, Arlington, Lindley, and Petrus Steyn. There are no bulk water suppliers providing potable water to any of their systems. The municipality has a total design capacity of 22 000kL/d with a system input volume of 17 000kL/d.

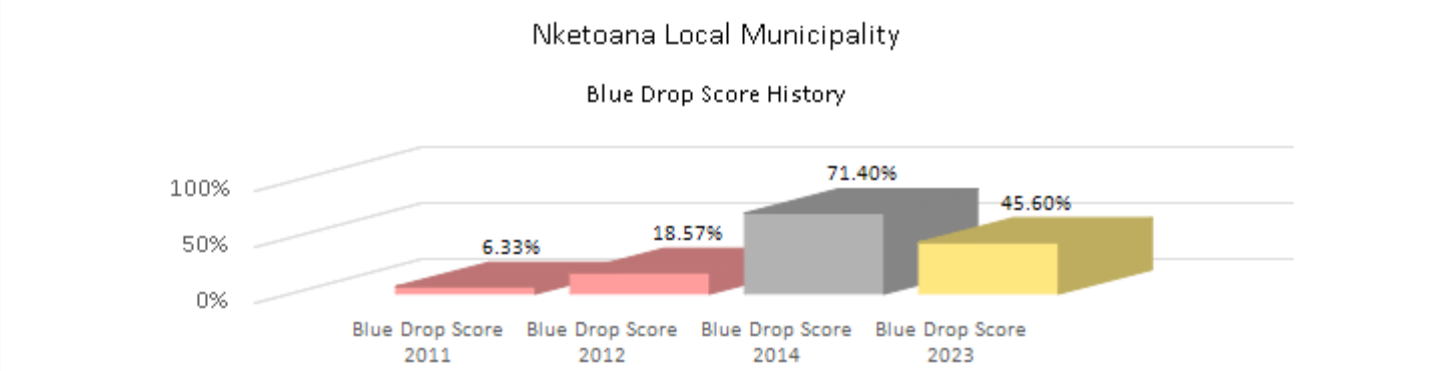
Regulator's Comments

The municipal officials accommodated the audit team, with intrepid expectation. A senior process controller from each plant was present and they had two young graduate / trainee staff that also participated. There are more than enough suitably qualified and classified process controllers within the municipality. With this as background, the municipality should be doing far better than audited. Improved support from management, technical and finance would go a long way to improving this situation. No specific capital budget for the audit period was presented.

Blue Drop Findings

The municipality does not have a Water Safety Plan in place, coupled with this there are no process audits that have been conducted. These two documents will have a profound impact in the management and monitoring of the water quality. The engineering and scientific capacity can be improved, as these staff would be able to initiate and complete the necessary Blue Drop criteria documents. The water division needs to get more actively involved with the financial aspects of managing their section as the information provided came from a contracted entity assisting the Municipality. Supply Chain Management needs to assist in contracting term contracts for the supply of chemicals, external electrical & mechanical services, the calibration / service and or replacement of water meters. Overall, the documentation of all activities in providing water services needs improvement.

An overall municipal Blue Drop score of 45.60% indicates that significant improvement still needs to be achieved, to ensure safe drinking water to the communities of Nketoana. The Regulator is concerned about the digress in performance since the last Blue Drop audit in 2014, whereby the municipality obtained a decent 71.40% score. Furthermore, no capital funds appear to be available to address the infrastructural needs for water supply and treatment. The poor TSA score of 28% for the Reitz system, coupled with good BDRR risk scores for three of the four treatment facilities gives hope that the municipality will be able to turn around water services delivery to meet compliance and good practice standards.



Technical Site Assessment

The ***Reitz water treatment system*** is maintained to basic standards, with an operational treatment process, and competent and willing staff. Water quality is monitored according to SANS 241 and is of good quality. Consumers may use the water with a level of confidence. No Directives have been issued by the Regulator. The high-risk areas mentioned need urgent attention to elevate the plant's ability to achieve higher standards of excellence. Refer to the BD Watch report 2023 for detailed information.

Raw water pump abstraction well from river. Poor OHS environment

Top of clarifier wall where rotating bridge runs been covered with steel plate due to concrete spalling underneath

Flocculation channels walls poorly constructed and deteriorating

4.17 Phumelela Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	41.34%
Blue Drop Score 2014	%	61.31%
Blue Drop Score 2012	%	17.90%
Blue Drop Score 2011	%	3.82%

Key Performance Area	Weight	Vrede 	Warden 	Memel 
Bulk/WSP		-	-	-
Capacity Management	15%	50.00%	50.00%	54.00%
DWQ Risk Management	20%	45.50%	45.50%	36.50%
Financial Management	10%	37.00%	37.00%	37.00%
Technical Management	20%	18.00%	18.00%	18.00%
DWQ Compliance	35%	66.50%	56.50%	23.50%
Bonus	10%	1.25%	1.25%	1.25%
Penalties	10%	0.00%	25.00%	0.00%
Disqualifiers		None	None	None
Blue Drop Score 2023	%	**47.30%**	**41.30%**	**31.05%**
Blue Drop Score 2014	%	62.55%	60.03%	60.75%
Blue Drop Score 2012	%	19.58%	11.83%	17.83%
Blue Drop Score 2011	%	1.00%	1.00%	9.46%
System Design Capacity	kL/d	3 500	7 500	2 000
System Available Capacity	kL/d	3 500	7 500	2 000
System Input Value	kL/d	3 500	7 500	2 000
Capacity Utilisation	%	NI	0.00%	NI
Average Daily Consumption	l/p/d	201	1 106	365
Resource Abstracted From		Venterspruit	Cornelis Dam	Klip River
Microbiological Compliance	%	99.99%	99.99%	92.54%
Chemical Health Compliance	%	99.99%	99.99%	99.99%
Risk Defined Compliance	%	96.95%	90.97%	88.49%
VROOM	Rand	**R1 330 000**	**-**	**-**
BDRR 2023	%	37.77%	63.00%	59.42%
BDRR 2022	%	96.30%	97.00%	95.50%

Introduction

The Phumelela LM supplies potable water to the communities of Vrede, Warden and Memel. No bulk provider is involved. The design capacity of the three treatment plants is 13 000 kL/day. The available capacity and SIV cannot be calculated due to lack of flow monitoring.

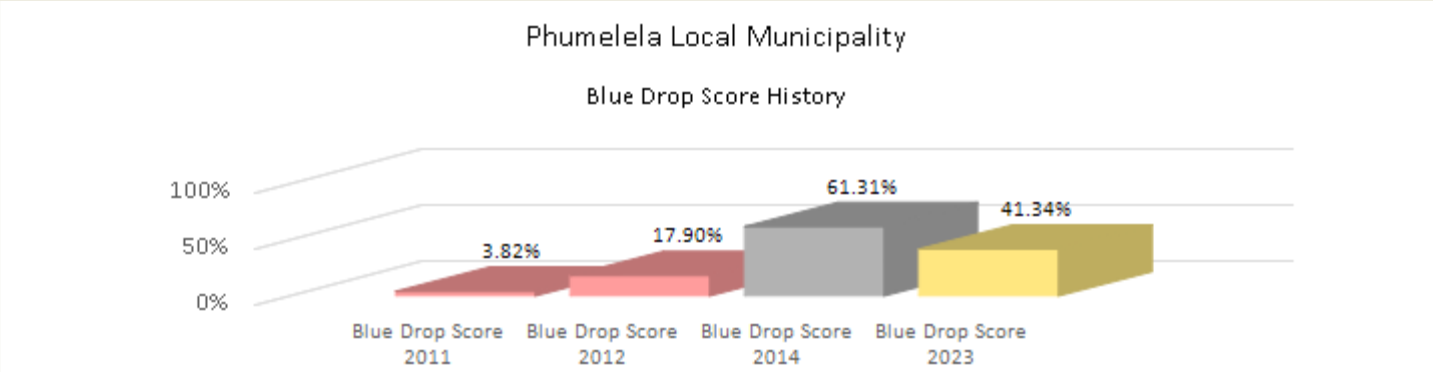
Regulator's Comments

The municipal team was led by the Senior Supervising Process Controller Ms. Ivy Mathaba and were adequately prepared for the assessment audit. An assortment of documents had been uploaded as portfolio of evidence, albeit not fully satisfying the requirements of the audit criteria.

Blue Drop Findings

Plant classification for the Vrede WTW needs to be re-applied for, as the pressure filters have been replaced with rapid gravity backwash filter units. Under the KPA for Technical Management Capacity, it is important that water volumes be measured and recorded from raw water uptake to treated water to distributed water. The lack of this information places the treatment plants in high-risk space (BDRR). The Regulator was impressed with the in-house execution of a basic conditional assessment, but this now requires senior management support for implementation. Site-specific operation and maintenance logbooks with maintenance records as per maintenance plan is lacking. A basic WaSP dated 18/7/2022 has been done internally, but lacks detail on water quality risks, risk scoring and priorities, and mitigation interventions. A basic DWQ monitoring program is in place for all systems and uses the recommended SANS 241 methodology as prescribed in the SANS schedules. No risk-based monitoring has been done. An incident register detailing events, causes, rectifications, and timeframes as well as a logbook to record incidents, needs to be implemented and maintained. A generic budget was provided but was not system specific. No expenditure could be provided, thereby also rendering Phumelela unable to calculate the cost of producing potable water to inform cost-reflective tariffs. It is recommended that the Municipality consolidate its water safety planning with the WSP report, as well as the asset condition assessment information.

An overall municipal Blue Drop score of 41.34% indicates that significant improvement still needs to be sought to ensure safe drinking water to the communities of Phumelela. The Regulator is concerned about the digress in performance since the last Blue Drop audit in 2014, whereby the municipality obtained a decent 61.31% score. Furthermore, no capital funds appear to be available to address the infrastructural needs for water supply and treatment. The moderate TSA score of 55% for the Vrede system, coupled with reasonable BDRR risk scores for two of the three treatment facilities gives hope that the municipality will be able to turn around water services delivery to meet compliance and good practice standards.



Technical Site Assessment

A technical site inspection of the **Vrede WTW** was conducted to verify the findings of the Blue Drop audit in the field. A TSA score of 55% was achieved, showing that the plant was in an operational state, with capable staff. The plant complied with SANS 241 standards and consumers may use the water with a high level of confidence. The plant lacks general maintenance and upkeep to improve workplace satisfaction. Refer to the Blue Drop Watch Report 2023 for more detail.

Main raw water pump station at the Dam

Launders within settling tank

Lamela plates within only a part of the settling tank

4.18 Setsoto Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	43.32%
Blue Drop Score 2014	%	42.21%
Blue Drop Score 2012	%	89.00%
Blue Drop Score 2011	%	88.64%

Key Performance Area	Weight	Clocolan (Clocolan TW)	Ficksburg (Ficksburg TW)	Marquard (Marquard TW)	Senekal (Cyferfontein and De Put TW)
Bulk/WSP		-	-	-	-
Capacity Management	15%	52.00%	60.00%	42.00%	40.00%
DWQ Risk Management	20%	24.00%	47.50%	28.50%	31.50%
Financial Management	10%	39.25%	39.25%	35.25%	39.25%
Technical Management	20%	29.50%	40.75%	21.50%	20.50%
DWQ Compliance	35%	11.00%	53.50%	41.00%	6.00%
Bonus	10%	0.00%	12.50%	0.00%	0.00%
Penalties	10%	12.50%	0.00%	0.00%	12.50%
Disqualifiers		None	None	None	None
Blue Drop Score 2023	%	26.28%	50.55%	34.18%	22.43%
Blue Drop Score 2014	%	31.49%	49.02%	39.26%	31.49%
Blue Drop Score 2012	%	89.47%	90.39%	87.15%	87.00%
Blue Drop Score 2011	%	94.11%	95.20%	91.89%	73.80%
System Design Capacity	kL/d	5 950	32 000	7 300	9 900
System Available Capacity	kL/d	5 950	32 000	7 300	6 600
System Input Value	kL/d	1 982	18 083	2 939	3 356
Capacity Utilisation	%	33.43%	56.51%	41.95%	50.85%
Average Daily Consumption	l/p/d	113	438	190	131
Resource Abstracted From		Caledon River, Lucretia Dam; Moperi Dam (overflow from Lucretia Dam)	Caledon River and Meulspruit	Laaispruit Dam (Laaispruit); Caledon River	Sand River; Sandspruit
Microbiological Compliance	%	87.01%	99.99%	97.06%	86.36%
Chemical Health Compliance	%	99.99%	99.53%	95.70%	95.45%
Risk Defined Compliance	%	84.96%	80.13%	86.47%	82.02%
VROOM	Rand	-	R8 907 808	-	-
BDRR 2023	%	58.86%	43.85%	40.45%	73.79%
BDRR 2022	%	79.60%	35.80%	95.90%	95.90%

Introduction

The Setsoto municipality currently serves a population of 117363 (22/23 IDP). Raw water sources include the Caledon and Sand Rivers, Meul, Sand and Laaispruit and the Lucretia / Moperi Dams. During the assessment period raw water was treated at five water treatment plants and distributed into four distribution networks. High turbidity raw water from the Caledon River, specifically during the rainy season, poses compliance challenges. Upgrading of the De Put WTW has commenced.

Regulator's Comments

The municipality was represented by Supervisors from three of the water treatment plants, Laboratory Technicians, and the Water Services Manager.

The decreasing trend in Blue Drop performance by the Setsoto municipality is of great concern with two of the supply systems being in a critical state. BDRR % deviations for these two plants, although improved, are in the medium and high-risk categories. The Blue Drop score for the Ficksburg Supply System has slightly increased and performance is regarded as average. Although the BDRR% deviation has increased it is still in the low-risk category.

A general lack of interest in working towards an improved score was observed. It was evident that employees were experiencing a lack of management support, and consequently a negative approach towards the Blue Drop programme. The exception is the Ficksburg Team. As already mentioned in the 2014 Blue Drop Report, the Team continues to be committed to an improved score. Excellent record-keeping systems are in place. Systematically filed operational data, flow measurements, pump hours, reservoir levels and detailed information on maintenance, with tracking of progress, are some of the available records. The DWS wants to commend the Team for their efforts, despite challenges experienced.

There is evidence of attempts to revise and update previous water safety plans; the documents are mostly incomplete. Full SANS analyses have been done for all systems, but results seem to be not uploaded. Chemical determinants are included in the monitoring programmes, but not based on the outcome of a water quality risk assessment.

Microbiological compliance in the Senekal and Clocolan supply systems needs urgent intervention. This was also reported in the 2014 Blue Drop report and the lack of management intervention and support to correct the situation is unacceptable. In addition, inadequate planning has resulted in the use of tanker services for the mitigation of supply challenges experienced.

The internal Setsoto laboratory has been maintained for several years. Evidence is available for calibration of instruments. The WSA has continued to participate in NLA and SABS proficiency testing. Acceptable scores have been achieved in the SABS testing scheme. The failures in the NLA testing scheme could possibly be contributed to by the absence of power backup during loadshedding. The matter is to receive immediate attention.

Registrations of WTWs are all completed. It is however disheartening that Process Controller registrations have not been corrected or followed up with Help Desk. The municipality needs to note that compliance for process controller staffing is legally mandated and is not a matter of discretion. Training needs, aligned with regulatory requirements, must be identified and funding is to be obtained or provided.

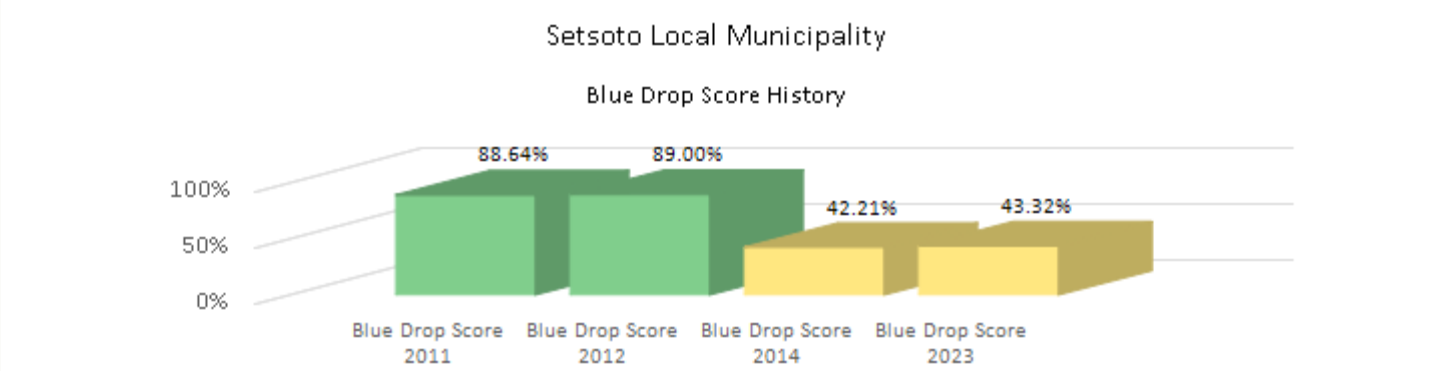
Various capital projects are in progress; for instance, refurbishment / upgrading of plants and replacement of pipelines.

With the necessary support and availability of information, the outcome of the assessment could have been different. Municipal management needs to demonstrate their commitment and leadership through providing the funding and resources that are required to ensure improvement in the performance of the municipality.

Blue Drop Findings

- The need for one representative and committed team striving for the same goal and supported by management was evident.
- Inadequate financial information. The evidence as requested by the Audit Team was unfortunately not forthcoming.
- Process audits were not done; the municipality is urged to provide the necessary budget for the appointment of an external professional.
- No evidence of network inspections at three of the supply systems. The work done at Ficksburg towards conducting network inspections is commendable.
- The WSA failed to provide water balance data and a strategy for water demand management. Water losses were calculated for the Ficksburg supply system.
- Employees have commenced the drafting of WaSPs. The documents are, however, incomplete. The necessary support from management is required to assist with the finalisation of the water safety planning process and the implementation of comprehensive risk management.

- The municipality does not meet the process controlling requirements for Draft Regulation 813. Training needs must be identified, and a budget must be available to provide training aligned with regulatory requirements.
- The credibility of results at the Setsoto internal laboratory is at risk. The municipality urgently needs to provide the laboratory with back-up power.
- Poor microbiological compliance in the Senekal and Clocolan supply systems, also mentioned in the 2014 Blue Drop Report. No proof of informing consumers was presented.
- Data capturing on IRIS seems to be challenging. Not all available results have been uploaded, adversely affecting compliance. The shortcomings must be identified and addressed. With little effort, and support and encouragement from management, this could have contributed to an increased Blue Drop score.
- Water quality monitoring is not based on the outcome of risk assessment processes. Risk based monitoring programmes, aligned with SANS 241, Part 2, must be compiled, and implemented.



Technical Site Assessment

A site inspection was conducted at the ***Ficksburg WTW*** and a score of 81% was achieved. The plant has a design capacity of 32 ML/d and abstracts raw water from the Caledon River and the Meulspruit. Abstraction is authorised, but daily abstraction volumes are exceeded. All administrative matters were attended to and in place. Microbiological quality of the water produced at the plant is excellent. Challenges are however experienced with turbidity removal. Drinking water is supplied to a population of 41 248. Refer to the Blue Drop Watch Report 2023 for more detail.

Setsoto Blue Drop Team attending the assessment and site inspection

Raw water pump station in Caledon River with two on-site raw water reservoirs receiving water from the Meulspruit and Caledon River

Ficksburg WTW treatment processes

The Regulator notes the dire state of management and drinking water quality in the Clocolan and Senekal water supply systems. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

4.19 Tokologo Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	24.78%
Blue Drop Score 2014	%	56.81%
Blue Drop Score 2012	%	25.46%
Blue Drop Score 2011	%	20.35%

Key Performance Area	Weight	Boshof Water Supply System	Dealesville Water Supply System	Hertzogville Water Supply System
Bulk/WSP		-	-	-
Capacity Management	15%	42.00%	42.00%	38.00%
DWQ Risk Management	20%	3.00%	3.00%	9.00%
Financial Management	10%	33.00%	43.00%	43.00%
Technical Management	20%	34.25%	23.75%	23.75%
DWQ Compliance	35%	0.00%	5.00%	48.00%
Bonus	10%	6.25%	6.25%	6.25%
Penalties	10%	25.00%	25.00%	25.00%
Disqualifiers		None	None	None
Blue Drop Score 2023	%	**17.68%**	**18.33%**	**31.48%**
Blue Drop Score 2014	%	57.89%	56.72%	56.08%
Blue Drop Score 2012	%	26.19%	24.51%	25.36%
Blue Drop Score 2011	%	22.85%	18.85%	18.85%
System Design Capacity	kL/d	2 972	1 922	5 000
System Available Capacity	kL/d	2 972	1 922	5 000
System Input Value	kL/d	2 972	1 922	5 000
Capacity Utilisation	%	100.00%	100.00%	100.00%
Average Daily Consumption	l/p/d	349	271	373
Resource Abstracted From		Groundwater	Groundwater	Surface Water (Vaal River) at Christiana
Microbiological Compliance	%	81.25%	42.86%	99.99%
Chemical Health Compliance	%	0.00%	0.00%	0.00%
Risk Defined Compliance	%	81.25%	42.86%	100.00%
VROOM	Rand	-	-	**R630 000**
BDRR 2023	%	77.75%	79.52%	51.06%
BDRR 2022	%	97.20%	97.20%	100.00%

Introduction

Tokologo Local Municipality is a Water Services Authority that owns and operates three Water Supply Systems namely Boshof, Dealesville and Hertzogville. The Boshof Supply System is borehole system and supplies drinking water to Boshof, Kareehof and Seretse areas to a population of approximately 8 500. The Dealesville Supply System is also a groundwater supply system and supplies potable water to Dealesville, Tshwaraganang and Dikgalaope to a population of approximately 7 100.

The Hertzogville Supply System is supplied with drinking water from a borehole scheme and a conventional water purification plant to Hertzogville and Malebogo to a population of approximately 13 400. Although the information is lacking, and gaps persist on Integrated Regulatory Information System (IRIS) because there is no evidence uploaded onto the system.

Regulator's Comments

Tokologo Local Municipality`s overall Blue Drop score has declined from an average score performance of 57% to 25% in 2014 to 2023, respectively. This deterioration is due to a failure by Municipal officials to submit required Blue Drop documentation. In addition, the Municipality did not develop and implement the Water Safety Planning process and conduct process audit or condition assessment among other Blue Drop requirements for each water supply system. Process audit should be conducted to all water treatment infrastructure in order for the Municipality to understand the conditions of the infrastructure to sustainably continue to supply safe drinking water to the residents of each town.

Development of water safety planning process provides the Municipality with the opportunity to identify potential risks associated with the water supply systems and control measures to mitigate all the risks. Furthermore, both Boshof and Dealesville microbiological quality compliance was inconsistent with SANS 241 requirements therefore pose serious health risks to consumers. The Municipality is expected to supply tap water that complies with the standard and microbiological results failed to meet SANS 241 requirements, an investigation should be conducted, and appropriate action taken to ensure that tap water poses no risk to consumers. The Department has further noted that chemical quality compliance is unknown at Boshof and Dealesville. However, the Department is encouraged to note that microbiological compliance at Hertzogville was in accordance to drinking water standard therefore tap water did not pose microbiological health risk to consumers. As indicated above, chemical compliance is poor since the Municipality did not conduct and submit chemical monitoring results to the Department therefore chemical quality compliance is unknow at all areas.

The Municipality has spent a total of R959,991 on the capital projects. These capital projects included a connection of Jojo tanks on water network at Hertzogville and Dealesville. The municipality has further spent R8,425,750 on the capital budget, but the expenditure was for emergence water supply at phase 3, Dealesville.

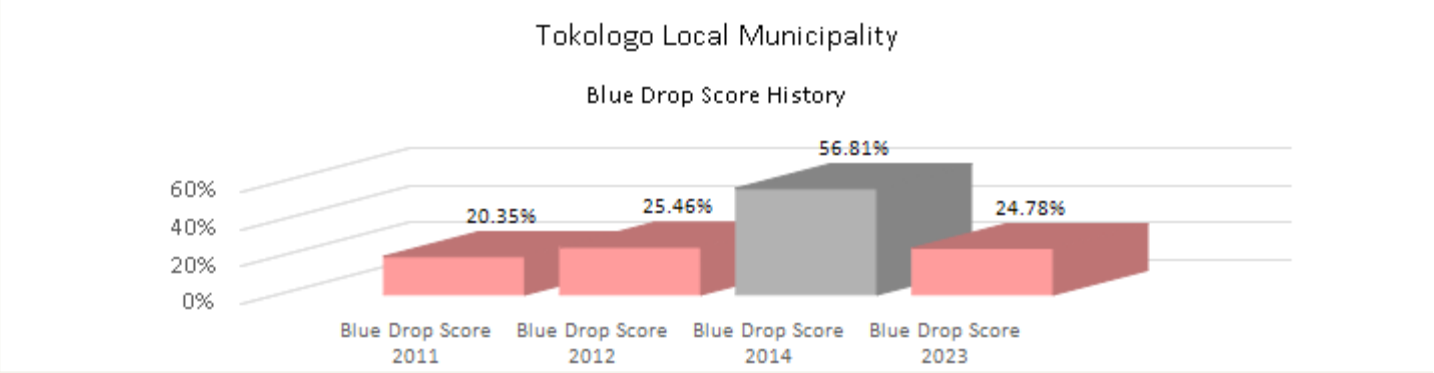
Blue Drop Findings

The Municipality requires to put serious attention on the process controlling both plant supervisor and process controllers did not meet the regulatory requirements in all water treatment works.

There was only electrical competency proof provided under maintenance capacity therefore there was a lack of qualified personnel to maintain the water infrastructure within the municipality. Regrettably, much of the information needed under maintenance capacity namely, approved organogram; mechanical competence; maintenance schedule and evidence of implementation such as job cards could not be provided in all water supply systems:

- Proof of Engineering technicians and Technologist were provided, however scientific capacity requirements should be prioritised.
- Proof of operational monitoring of water treatment processes was provided at Hertzogville, for the rest of water treatment works, the Municipality could not provide any proof. Each water treatment works within the municipality needs to have an operational monitoring programme in place and monitoring equipment to enable the process controllers to guide water treatment processes based on the operational results on-site.
- Proof of design capacity of water treatment works, and twelve average daily volumes should be documented and provided in the future assessment.
- Microbiological data was submitted for between two, four and six Hertzogville, Boshof and Dealesville respectively. This is inconsistent with the SANS 241 requirements therefore the municipality should improve micro monitoring data submission.
- Chemical monitoring programme should be implemented in all water supply systems as prescribed by SANS 241.
- The Municipality as a water services provider and authority should develop a water safety plan and prioritises identified high risks and put mitigation measures to reduce the risks to all water supply systems.
- A water treatment process audit should be done, and recommendations should be implemented as per the Blue Drop requirements.
- The Municipality is commended for providing the budget and expenditure for the assessment period. However, the raw data, the energy consumption and the water treatment chemical costs were not provided.
- The Municipality could not provide water losses and water demand management of all water supply systems therefore average daily consumption reported could not be verified and furthermore may not give true reflect as depicted on the report.

Tokologo Local Municipality should put more effort into ensuring that drinking water is managed in a sound manner. The Municipality has to pay attention to all Blue Drop findings raised above and develop some action plan to improve the Blue Drop score on the future assessment. The 2022 Blue Drop Risk Rating remained high risks to at Boshof and Dealesvile however, there was a significant improvement at Hertzogville which moved from critical to medium risk.



Technical Site Assessment

The ***Hertzogville WTP*** was inspected to verify the Blue Drop audit findings and received a Technical Site Score of 75%.

The Hertzogville plant is well operated by staff whom the assessors met and who they were found to be knowledgeable of operation of the water treatment processes. The process controller on duty during assessment seemed to understand his duties and responsibilities. The plant was kept tidy, and this shows that the process controllers take their work serious. The details of the technical assessment findings are in the 2023 Blue Drop Watch released in June 2023.

Hertzogville Water Purification Plant`s raw water holding dam and the raw water is abstracted from Vaal River under Water Use License No: - 10/C91A/ACL/1915

Picture of available six blade paddle stirrer at Hertzogville Water Purification Plant but not utilised

Picture of a typical rapid mixing at Hertzogville Water Purification Plant, a channel with rapid fall in level and buckets with a water treatment chemical liquid

The Regulator notes the dire state of management and drinking water quality in the Boshof and Dealesville water supply systems. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

4.20 Tswelopele Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	73.78%
Blue Drop Score 2014	%	70.10%
Blue Drop Score 2012	%	92.42%
Blue Drop Score 2011	%	54.71%

Key Performance Area	Weight	Bultfontein Supply Zone	Hoopstad Supply Zone
Bulk/WSP		-	-
Capacity Management	15%	57.00%	60.00%
DWQ Risk Management	20%	76.00%	79.00%
Financial Management	10%	74.50%	74.50%
Technical Management	20%	55.00%	50.00%
DWQ Compliance	35%	87.50%	87.50%
Bonus	10%	12.50%	12.50%
Penalties	10%	0.00%	0.00%
Disqualifiers		None	None
Blue Drop Score 2023	%	73.76%	73.81%
Blue Drop Score 2014	%	70.28%	69.82%
Blue Drop Score 2012	%	92.97%	91.78%
Blue Drop Score 2011	%	62.10%	43.35%
System Design Capacity	kL/d	8 800	6 000
System Available Capacity	kL/d	8 800	6 000
System Input Value	kL/d	8 100	4 813
Capacity Utilisation	%	92.05%	80.22%
Average Daily Consumption	l/p/d	276	268
Resource Abstracted From		Vet	Vet
Microbiological Compliance	%	99.99%	99.99%
Chemical Health Compliance	%	99.99%	99.99%
Risk Defined Compliance	%	99.10%	98.90%
VROOM	Rand	-	R1 221 000
BDRR 2023	%	23.66%	22.62%
BDRR 2022	%	36.80%	52.50%

Introduction

The Tswelopele Local Municipality supplies drinking water from the Bultfontein and Hoopstad water treatment plants. The total population residing within the boundaries of the municipality is 47 300. Raw water is abstracted from the Vet River and evidence of Water Use Licenses are in place for both water treatment plants.

Regulator's Comments

The absence of a representative Team during the assessment, was disappointing. The Regulator is however impressed with the preparedness of the WSI. Most evidence was uploaded well in advance. The municipality is furthermore commended on efforts exerted to present to the Audit Team an overview of the water treatment supply systems. Meaningful information was provided on site assessments, risk management and Blue Drop progress.

The Department congratulates the WSI with the improved BDRR and Blue Drop scores. With the installation of flow meters, drinking water monitoring aligned with SANS 241, Part 2, and an improvement in compliance with Regulation 2834 / Draft Regulation 813, the WSI will be well positioned to approach Blue Drop Certification in 2024.

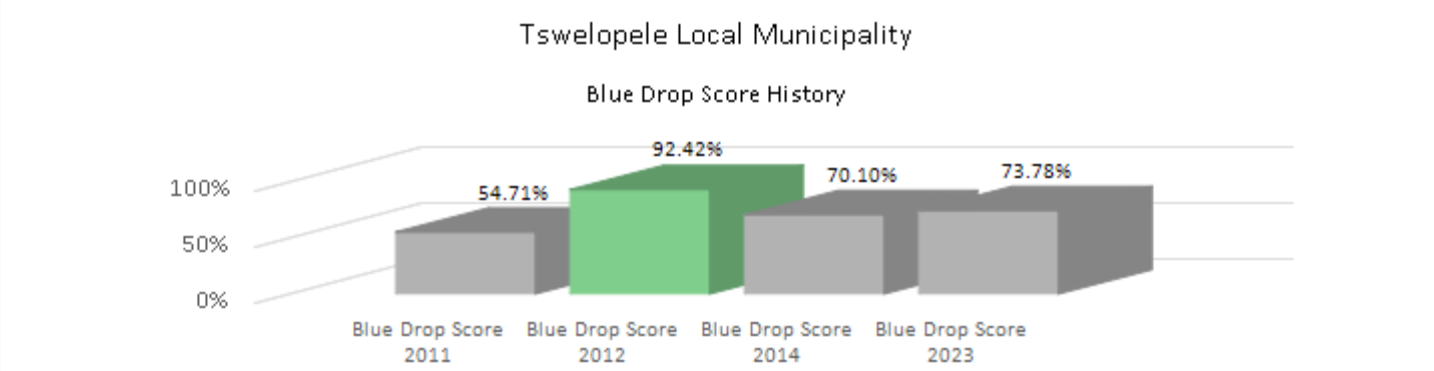
Operational monitoring is in place at both water treatment plants. With the implementation of the comprehensive log sheets and recordkeeping system, Supervisors will be able to easily use all data to assess performance and compile reports. It is recommended that the DWS be approached regarding the current raw water abstraction volumes which are more than authorised volumes. Water quality monitoring has been consistent since 2010. Water quality performance is excellent; attention is however required on IRIS administration related to the risk profiles. Identified water quality risks are also not monitored as required by SANS241-2:2015.

Process audits and network inspections were conducted, and Water Safety Plans were updated with site specific risks assessments and control measures. Although water quality risks assessments are included in the water safety plans, there is insufficient detail on monitoring programmes in accordance with SANS 241, Part 2.

Capital budgets and expenditure were provided for refurbishment / upgrades for both supply systems. Some of the matters identified through the water safety planning process are already addressed.

Blue Drop Findings

- The process controlling staff compliment is inadequate at both water treatment plants. The appointment of new staff should be aligned with Draft Regulation 813.
- Raw water abstraction volumes are in excess of authorised allocations.
- Although water quality risks have been determined, monitoring is not aligned with SANS 241, Part 2.
- Design capacities are not available.
- Flow measurement is of concern but will be addressed through the current projects.
- Financial information was provided by the supply system as calculated by the Technical Department. The cost per kl is calculated. The budget is excessively overspent.
- Information on quality assurance for non-accredited methods must be obtained from the contracted laboratory at regular intervals following each proficiency testing round.
- Maintenance records were not available for the Bultfontein supply system. A comprehensive recordkeeping system was ready for implementation at both supply systems.



Technical Site Assessment

The ***Hoopstad WTW*** was inspected to verify the Blue Drop audit findings. The score obtained for the technical site inspection is 82%. The good relationship between process controlling personnel and their principals is commendable. Two Process Controllers were given the opportunity to lead the Blue Drop Team during the site inspection. They displayed good knowledge of the plant and its operation.

The plant is well operated. The site is well kept and all areas inside the building very neat and tidy. Recordkeeping is good and Process Controllers could easily provide all on-site information requested by the Audit Team. The water supplied to consumers is of excellent quality. Refer to the Blue Drop Watch Report 2023 for more detail.

Site assessment Team

Raw water pump station

Operational monitoring equipment excellently maintained, with proof of daily record keeping

JB Marks officials and audit team – satisfied after a Blue Drop audit…

City of Ekurhuleni staff and audit team – still smiling after the audit…!

5.CONCLUSION AND WAY FORWARD

The National Blue Drop Report 2023 provides recommendations and guidance for the way forward and can be accessed via the DWS homepage.

In summary, the way forward would entail sustainable improvement of the South African water services sector. Following the Blue Drop audit findings, the Regulator intends to intervene as follows:

- ***Infrastructure Actions***

i. DWS together with COGTA and NT has developed an action plan which covers municipalities which have wastewater- and/or drinking water systems which scored less than 10% in the Green Drop and/or Blue Drop assessments (i.e. municipalities which are performing the worst in terms of their water quality and sanitation services)
ii. This plan has been approved by Cabinet and presented to COGTA MINMEC
iii. The plan covers 30 municipalities in 7 provinces, with Gauteng and KZN not having any municipalities with <10% Drop scores from the Green Drop and Blue Drop assessments
iv. DWS and COGTA are allowing municipalities to use their MIG and WSIG funding for repairs and refurbishment
v. However, this does not address the lack of routine maintenance by municipalities, which must be funded from municipal revenues. This can only be addressed by improving municipal billing and revenue collection and by prioritisation of budgets for maintenance by the municipal leadership
vi. MISA is offering support to municipalities to improve their infrastructure asset management and to undertake infrastructure condition assessments
vii. In most cases, funding for refurbishment or augmentation of infrastructure to address the Blue Drop infrastructure-related findings has already been allocated over the MTEF, mostly through DWS's RBIG and WSIG grants and DCOG's MIG grant, but also by the municipalities themselves and/or through support from the private sector in a few instances
viii. For those municipalities which do not yet have funding allocations to address the Blue and Green Drop infrastructure-related findings, DWS and COGTA will work with these municipalities to reprioritise their grant allocations to address the findings.

- ***Support and Capacity Building Actions***

i. The effectiveness of capacity building measures is dependent on the municipal leadership being willing to implement advice and improvements
ii. In some municipalities, there are no people to train because the municipalities have not prioritised the hiring of qualified process controllers
iii. While the national government is providing funding for repairs and refurbishment, it cannot provide funding for routine maintenance – this must be funded from municipal revenue
iv. In those cases where the leadership of the municipality is not responding to directives, or taking advice, or not accepting or using support, performance can only be improved by addressing the leadership challenges.

MISA is building capacity in the municipalities by:

- Hiring engineers and making them available to the municipalities to assist them with engineering expertise.
- Recruiting and allocating young graduate engineers and apprentices to municipalities
- Facilitating the training of process controllers
- Offering support to municipalities to improve their project management, contract management and asset management practices.
- Assisting the municipalities with funding applications for infrastructure.

DWS is building capacity in the municipalities by:

- Councilor induction programmes, in collaboration with SALGA
- Training of process controllers and support with registration of process controllers
- Support with registration of wastewater and water treatment works
- Assistance with development of water services development plans and five-year reliability plans
- Assistance with the development of water safety plans, risk abatement plans, sludge management strategies, and operational and compliance monitoring plans.

- ***Financial Sustainability Actions***

i. In terms of the Local Government Fiscal Framework, municipalities obtain revenue from municipal property rates and from service surcharges on the sale of water and electricity, in addition to the equitable share and grants from national government
ii. However, municipal revenue from the sale of both water and electricity is under pressure - electricity revenues are under pressure due to load shedding, customers moving to off-grid solutions, and bulk electricity prices increasing more quickly than retail electricity prices
iii. With the relevant sector departments' support, including COGTA, NT is leading the review of the Local Government Fiscal Framework, to be completed by November 2024.

- ***Governance Interventions***

i. Half of the 30 municipalities which scored less than 10% in the Green/Blue Drop assessments are also on COGTA's list of 66 dysfunctional municipalities
ii. A quarter of the 30 municipalities are also on National Treasury's list of 79 municipalities in service delivery and financial crisis or in serious financial trouble and requiring intervention. NT has recommended that Provinces implement mandatory interventions in terms of Section 139(5) of the Constitution and Chapter 13 of the MFMA for these municipalities
iii. However, most Provinces have been non-responsive to these recommendations leaving the problems to worsen
iv. If Provinces fail to act, there is a likelihood of communities approaching courts to force national government to act in terms of Section 139(7) of the Constitution (refer Lekwa case study)
v. Whilst national interventions are provided for in the Constitution, the capacity to intervene at national level is limited and Provinces must lead the interventions
vi. COGTA in consultation with DWS will assess the access to skills and resources in South Africa to maintain 144 WSAs and if necessary, bring recommendations to Cabinet for reducing the number of Water Services Authorities by July 2024.

National Treasure is building capacity in municipalities by:

i. Ensuring that tariffs for trading services are set to be cost reflective and to recover the cost of providing the service
ii. Reconciling the general valuation roll (GVR) to the billing system for completeness of revenue, so that all customers that appear on the GVR also appear on the billing system
iii. Developing tariff policies to reduce disputes
iv. Improving indigent management
v. Assisting municipalities to institutionalise standard operating procedures for financial management
vi. Improving billing and revenue collection
vii. Issuing a transversal tender for smart prepaid meters for electricity and water to enable prepayment for water services, to be advertised early 2024
viii. Availing technical advisors under the Municipal Financial Improvement Programme (MFIP), as well as by Budget and Revenue Management technical advisors placed at 7 provincial treasuries and NT offices, and 22 municipal support technical advisors placed in districts.

- ***Legislative Amendments***

i. Water Services Act distinguishes between roles of WSA and WSPs. Only a municipality can be allocated the power and function for the WSA function, as allocated by Minister of COGTA, whereby a WSA is the primary Constitutional water role of municipalities.
ii. WSA can approve any legal entity (municipality, municipal entity, another municipality, CBO, NGO, organ of state, private company, or water board) to function as a WSP in the municipality.
iii. Almost all municipalities are currently both WSA and WSP, having approved themselves as sole WSP.
iv. Water Services Act requires WSA and WSP functions to be managed and accounted for separately by municipalities, this is not happening.
v. Key role of WSA is to ensure that WSP provides services which meet minimum norms and standards, this is not happening.
vi. DWS is therefore amending the Water Services Act to strengthen the WSA role in municipalities:

- Introduce an operating license system for WSPs, to be managed by DWS as the national regulator.
- Introduce requirement that water services can only be provided by an entity (municipality or other entity) that has an operating license. This will enable WSAs to ensure that WSPs have minimum competency, capability, and performance levels.
- Amend S63 of the Act, to enable the Minister, as a last resort, to force separation of the water services function from the municipal administration where there is persistent failure to meet license conditions, and require the Water Services Authority to contract with a licensed WSP (after a S78 Municipal Systems Act process)
- In such instances, the appointed licensed WSP will take over all the functions related to providing the water service, including billing and revenue collection, SCM and HRM
- Currently S63 of the Act is impractical because it does not provide for all these functions to be taken over – the amendments will enable the licensed WSP to be funded.

- ***Other Actions***

i. DWS is in the process of strengthening its regulation function and improving the consistency of its regulatory actions. This includes revising the norms and standards for water services, developing standardised regulatory protocols, publishing a public dashboard of municipal performance against a range of measures of water and sanitation performance, and linking support and regulatory action to the contents of the dashboard – the dashboard will be in place by March 2024
ii. DWS has established a Water Partnerships Office together with the DBSA and SALGA to facilitate more private sector involvement in the management and funding of municipal water services and to offer financial structuring and feasibility study support to municipalities to bring projects to market.
iii. DWS and COGTA will promote cross-pollination between municipalities – good performing municipalities to assist poor performing ones.
iv. DWS will develop guidelines and standard operating procedures for operations and maintenance of water and sanitation infrastructure by municipalities.
v. COGTA has gazetted municipal staff regulations and will develop prototype staff establishments. This is a multi-year project that commenced during 2022 and should be completed by July 2025.
vi. NT is currently leading a review of the entire conditional grants system. This review will be completed by 31 March 2024 and its implications will be phased in from the 2025 Budget process. It will identify how grant funding can be used efficiently and effectively, while creating the right incentives to encourage better management of resources and leveraging private sector resources and expertise.

Last but not least, the Department welcomes the participation of SanParks in the Blue Drop process and trust the results will guide the way for the Kruger National Park to become a world-class water services institution.

Water Services Institutions are hereby encouraged to commence immediately with the preparation for the next Blue Drop audit process.

For 2023, Blue Drop awards and acknowledgement are attributed to the Free State province as follows:

BLUE DROP AWARDS and RECOGNITION	
BD Certifications to Municipalities [≥ 95% BD scores]	None

RECOGNITION OF TEAMS and INSTITUTIONS				
Awards	**Criteria**	**Winner**	**2nd runner up**	**3rd runner up**
Best Provincial Risk Managers	Free State	Tswelopele LM (23.2%)	Metsimaholo LM (30.2%)	Dihlabeng LM (30.6%)

RECOGNITION OF INDIVIDUALS and BLUE DROP CHAMPIONS			
Province	**Recognition**	**Name and Designation OR Audit Team**	**Award**
Free State	Matjhabeng LM	Charlene Smith	Charlene is commended for excellent presentation of BD information with all supporting documents uploaded on IRIS. Charlene communicated all information to relevant departments ensuring attendance by multi-disciplinary team which included finance, asset management, water demand management and senior management. In addition, the Blue Drop team, under Charlene's guidance prepared for the confirmation session and sent list of KPI to be discussed during confirmation session. Her honesty and mentoring of junior staff members to take over responsibility for Blue Drop compliance is commended as this will ensure the municipality continues to strive for Blue Drop Certification.
Free State	Dihlabeng LM	Audit team	The Dihlabeng municipality was represented by a multidisciplinary team. Representatives from executive management were present for almost the full first day. The Inspectors have observed excellent leadership and good team dynamics. The municipality can be proud of this Team, led by the Manager, Water and Sanitation. The Team has demonstrated its commitment towards the programme by uploading evidence for almost all the Blue Drop criteria, although some following the on-site assessment. Confirmation feedback notes were attended to and it was evident that there is not only commitment but a drive to improve.
Free State	Dihlabeng LM	Lawrence Ramulwela	Mr Ramulwela is the Manager Water and Sanitation. He is recommended for his strong leadership. He ensured attendance by a multi-disciplinary team including the Mayor, the Municipal Manager and the CFO. He engaged all the staff during the audits and the site visits. He gave employees the opportunity to be actively involved in the compilation of the water safety plans and plant audit and network inspection reports. Although the quality of the reports could be improved, it was evident that all efforts were made to follow the guidelines for compiling the reports. He and his team laid a firm foundation for future improvement.

RECOGNITION OF INDIVIDUALS and BLUE DROP CHAMPIONS			
Province	**Recognition**	**Name and Designation OR Audit Team**	**Award**
			The manner in which he delegated the tasks and how he guided them clearly shows that he does not only understand the management systems very well but also that he wants to build the capacity of the team. His involvement on ground level is commendable.
Free State	Setsoto LM	Hendrik Coetzer	Hendrik Coetzer is responsible for the Ficksburg Water Supply System. He is commended for excellent recordkeeping and availability of information. The manner in which he prepares, organises and files records is outstanding. He was well prepared for the assessment, with evidence uploaded and all records systematically filed and presented to the Inspectors, including supply chain information and tracking of orders. He is furthermore commended for the outstanding manner in which he investigates incidents, identifying the root causes and various solutions, and finally formally motivating for repairs or replacements with a complete list of prices from suppliers. He keeps an updated list of equipment like pump sets, with photos and GPS coordinates. Many Supervisors will benefit from adopting the principals and procedures that he has implemented.
Free State	Tswelopele LM	Audit Team	Although the municipality was not presented by a multi-disciplinary team, the Technical Director, Technical Manager and Inventory Officer were available. The Inspectors were impressed with the preparedness of the WSI. Most evidence was uploaded well in advance and compiled in a clear and understandable manner. The Team is furthermore commended on efforts exerted to present to the Audit Team an overview of the water treatment supply systems. Meaningful information was provided on site assessments, risk management and Blue Drop progress. Although Supervisors and Process Controllers did not attend the assessment, they are very much involved in the process. Attendance registers of the water safety planning meeting and risk assessments show their participation. It was also heartening to see the dynamic between staff and management. Two process controlling staff members, together with the Technical Manager, took the Inspectors through the plant for the TSA. The good relationship between process controlling personnel and their principals is commendable.
Free State	Tswelopele LM	Piet Kale (Supervisor) and John Sekharume (Process Controller)	These two process controlling staff members were given the opportunity to lead the Blue Drop Team during the site inspection. They were accompanied by the Technical Manager, who was never stepping forward to answer questions. He allowed them to take the Audit Team through the process. The ease and confidence in which they presented themselves and with which they engaged with the Inspectors is surely strengthened by the management style. They displayed good knowledge of the plant and its operation. It was evident that they understand the process and the procedures, including the completion of the records and interpretation of the results. They could easily provide all on-site information requested by the Audit Team. The fruits of practical capacity building through good mentorship was displayed here.

"It always seems impossible until it's done."
Nelson Mandela

Drakenstein: Welvanpas raw water inlet work –clean, maintained, operated by a proud competent team

Saldanha: Withoogte WTW filter backwash – true excellence

Bergriver: Piketberg WTW raw water pumpstation – deteriorating raw water quality, but staff displayed good knowledge of this risk via the water safety plan

Clarification - essential to remove suspended solids to provide a clear, high quality potable water to consumers

ANNEXURE A: BLUE DROP CALCULATIONS

PARAMETER	DESCRIPTION	CALCULATION	REFERENCE
Blue Drop Scores	A BD % is awarded to an individual WSS based on audit results considered against 5 KPAs. The individual audit scores aggregate as a single (weighted) BD score for the WSI. The score is weighted against the SIVs of the individual WSSs.	1) System BD score (%) = Sum (Audit scores x KPA sub weights) for each of the 5 KPAs Example: KPA 1 sub weight = 15% of 100% for all 5 KPAs; KPA 1 sub-weights are 20% each for sub-KPAs 1.a) to 1.e) as per BD Requirements in the scorecard KPA 1 = (100% x 0.2) + (100% x 0.2) +(90% x 0.2) + (100% x 0.2) + (100% x 0.2) = 98% Contribution of KPA 1 to the overall BD score = (98% x 0.15) = 14.7% (out of 15%) 2) WSI BD score (%) = Sum ((SIV / Total SIV) x System BD score) Example (WSA - 2 Systems): WSA BD score = ((200,000 kl/d / 255,000 kl/d) x 66.4%) + ((55,000 kl/d / 255,000 kl/d) x 86.6% = 70.7%	Introductory Provincial and National Chapters
Blue Drop Risk Rating	BDRR and %BDRR/BDRRmax The BDRR value is based on 5 (weighted) risk indicators, i.e. the design capacity, operational capacity, water quality compliance, technical skills and water safety plan skills. The %BDRR/BDRRmax provides the variance of a BDRR value against the maximum BDRR value that could potentially be reached if all 5 risk indicators are in critical state	See section to follow this table titled CALCULATION OF BDRR	Introductory Provincial and National Chapters
Technical Site Assessments	The TSA % reflects the physical condition of the delivery network, the water treatment plant, and part of the distribution network. The intention of the TSA is to verify the evidence and findings presented during the BD audit through the physical inspections of randomly selected sites	Singular TSA scores per WSS inspected, non-weighted, as calculated via the TSA scorecard.	BD scorecards
	TSA and BD score comparison	% Deviation (TSA & BD score) = % score difference Example: TSA score = 44% and BD score = 38% = 6% deviation or difference	Diagnostic 4
Technical Competence	Ratios to do a comparative analysis “Qualified Technical Staff” - staff appointed in positions to support water services, and who has the required qualifications. “Technical shortfall” means the number of staff who are in technical support positions. “Qualified Scientists” - professional registered scientists (SACNASP) appointed in positions to support water services. “Scientist’s shortfall” means the number of scientists in scientific positions that are professional registered and qualified in technical support positions but not qualified. “Shortfall” is calculated based on a minimum requirement of more than one of each of Engineers, Technologists & Technicians or at least 3 Engineers; and at least one 1 candidate & professional Scientist per WSI or more than 1 professional Scientist per WSI.	Ratio - A : B (2 elements) or A : B : C (3 elements) etc Example 1: WTW staff - No. Supervisors : No PC = 1 : 3 (based on 2 shifts) Example 2: If WSI has no qualified technical staff, the shortfall would be 3 or 4 qualified technical staff; Similarly, If WSI has 1 qualified technical staff, the shortfall would be 2 or 3 qualified technical staff Example 3: If WSI has no qualified scientific staff, the shortfall would be 1 qualified scientist & 1 candidate scientist; Similarly, If WSI has 1 qualified scientist, the shortfall would be 1 candidate scientist	Diagnostic 1
Treatment Capacity	System Input Volume (kl/d) is the WTW Input Volume towards the Water Supply System (This equates the outflow of the WTW/ inflow to the	WTW to single WSS: WTW SIV (kl/d) = WSS SIV (kl/d) WTW to multiple WSSs: Total WTW SIV (kl/d) = WSS 1 SIV (kl/d) + WSS 2 SIV (kl/d) etc	Diagnostic 2

PARAMETER	DESCRIPTION	CALCULATION	REFERENCE
	WSS from the Bulk Water Supplier, e.g. Water Board or Private WSP)	Multiple WTWs to single WSS: Total WSS SIV (kl/d) = WTW 1 SIV (kl/d) + WTW 2 SIV (kl/d) etc	
Drinking Water Quality Compliance	% Mean, % Minimum and % Maximum of the DWQ Compliance: C overall, C1a, C1b, C2a & C2b as linked to the BDRR calculation process % Mean, % Minimum and % Maximum of the DWQ Risk Defined Compliance and Treatment (Operational) Efficiency Index	1) Mean (arithmetical average) = Mean (Range of values) Example: Mean (24% + 71% + 91%) / 3 = 62% 2) % Compliance = # Compliant samples / Total # Samples tested *100 Example: %Compliance = 42 compliant samples / 50 total samples tested = 84% compliance	Diagnostic 3
Operation & Maintenance & Refurbishment of Assets	O&M Cost Benchmarking using: - WRC WATCOST model: calculated breakdown of assets into civil, buildings, pipelines, mechanical, electrical, instrumentation. - SALGA model: calculate annual maintenance cost per asset type based on benchmark of 15.75% of asset value	1) Current asset value (100% = Civil structures (46%) + Buildings (3%) + Pipelines (6%) + Mechanical equipment (35%) + Electrical equipment (8%) + Instrumentation (2%) 2) Modified SALGA maintenance guideline: 15.5% = Civil structures (0.5%) + Buildings (1.5%) + Pipelines (0.75%) + Mechanical equipment (4%) + Electrical equipment (4%) + Instrumentation (5%) Example (Civil structures) = (0.46 x R20,000,000) X 0.005) = R46,000	Diagnostic 5
VROOM	Estimation of cost required to restore existing infrastructure to its original design capacity and operational functionality by addressing civil, mechanical, and electrical failures or defects. The cost is derived from an algorithm that uses the BD Inspector's impression of the condition of the hardware, for each process unit inspected. Cost estimations are done for the treatment plant only, NOT for the supply network.	With reference to the earlier 'Technical Site Assessments' parameter: The following is extracted from the TSA scorecard and inserted into the IRIS scorecard: VROOM cost ratio in R million per Ml/d % cost estimates for Civil, Mechanical and Electrical deficiencies.	BD scorecards Diagnostic 5

CALCULATION OF BDRR

A. First BDRR formular

In 2015, the Department used the experience built-up during the previous four Blue Drop assessments to formulate a Blue Drop Risk Rating (BDRR) that represents a progressive combination of incentive and risk-based regulation. The BDRR allows for uniform measurement of all systems across the country with regards to treatment capacity, process control and water quality compliance and to answer the following questions:

- Does the system have sufficient capacity to meet safe drinking water quality limits?
- Is the WSA complying with technical (process controller and maintenance staff) requirements?
- Is the WSA complying with SANS 241 (or any limits set by the Department)?
- Is the WSA managing drinking water quality according to the principles of risk management?

The original BDRR formula was: **BDRR = 0.25A + 0.25B + 0.5C**

Where the weighting factor is based on the following three risk indicators:

- A: Treatment Capacity = Population X Operational Capacity
- B: Process Control = Process Controllers + Supervisor + Maintenance Team
- C: Water Quality Compliance = Population X [(0.8*(0.5Micro + 0.2Chem + 0.3Risk)) + (0.2*(0.6WSP + 0.2Monitoring + 0.2Full SANS))] where
  - ✓ Micro = Microbiological compliance
  - ✓ Chem = Chemical compliance
  - ✓ Risk = Risk-defined monitoring
- WSP = Water Safety Plan (Yes/No/Partial)
  - ✓ Monitoring = % Monitoring compliance
  - ✓ Full SANS = Full SANS, risk-based monitoring programme (Yes/No/Partial)

The BDRR calculation is weighted against population size considering the population risk factor i.e. the larger the population served by the water supply system, the larger the impact should any hazardous event occur in the system, viz. the number of people who may be impacted. The BDRR formular was used by the DWS to determine the level of risk at which water services and water quality was delivered to the citizens of South Africa thereby facilitating implementation of regulatory actions to improve water quality where critical and high risks were identified.

B. Alignment of BDRR with DWS Risk-based Regulation

The DWS Risk-based Regulation allows for four key risk indicators that apply to *Blue Drop* (water), *Green Drop* (wastewater), and *No Drop* (water use efficiency):

- A: Design capacity
- B: Operational flow
- C: Compliance
- D: Technical skill of the supervisor, process controllers and maintenance team

The Green Drop Cumulative Risk Ratio (CRR) was the first to have been developed and has a successful track record that allows for identification of high risk treatment plants. One of the reasons why the CRR has enjoyed high uptake and impact, was that it is used as part of the wastewater risk abatement plan (W_2RAP) [the equal of the Water Safety Plan]. The (existing) formula calculates the Green Drop Risk rating as follows: **CRR = A x B + C + D** *Where:*

- A: Installed design capacity: Larger plants present a higher risk
- B: Operational capacity: Plants operating above its capacity present a higher risk
- C: Effluent quality compliance: A high number of non-compliant effluent quality parameters present a higher risk
- D: Technical skills: Poor technical, management and maintenance skills base present a collective and individual high risk.

C. Updated BDRR Formular

The updated BDRR formular adopts the same approach with an added risk indicator, E: Water Safety Planning, to address the risk assessment requirements outlined in SANS 241. The updated BDRR formular is:

BDRR = (A x B) + C + D + E

Where the weighting factor is based on the following five risk indicators

- A: Design Capacity: Larger plants present a higher risk as they supply water to a larger population
- B. Operational Capacity: Plants operating above its installed capacity present a higher risk as its capability is compromised to deliver safe drinking water
- C: Water Quality Compliance: C1 Microbiological (70%) + C2 Chemical (30%)
- D: Technical Skills: Poor technical, management and maintenance skills base present a collective and individual high risk.
- E: Water Safety Plan: The absence of a WSP, risk-defined monitoring programme based on full SANS 241 assessment and implementation of actions to reduce risk, would represent a high risk due to non-compliance with SANS 241 requirements and lack of risk-management procedures.

The proportional risk allocation between the components is 35 : 35 : 20 : 10 for A/B : C : D : E.

Therefore full BDRR formular = **(35% (A*B)) +[35% C (70% C1 (Micro compliance X monitoring compliance) + 30% C2 (Chemical compliance x monitoring compliance)] + 20% D + 10% E.**

The benefits of the updated BDRR formular are:

- Aligned with CRR and DWS Risk-based approach
- Simplified calculation which uses available information on IRIS
- Provide calculation of baseline BDRR for each plant based on size
- Includes Risk Rating Indicator for *Water Safety Planning* – requirement for SANS 241
- Provides a quick, scientific-based impression of national WTW risk profiles
- Standardised, uniform approach - rates all plans on equal level

A ***BDRR value*** is calculated for each municipal water supply system in South Africa, as provided in this Blue Drop PAT Report. The municipal BDRR profiles are usually sent to the respective Executive Mayors from the Minister's office, to inform the political principals of the facilities that reside in the high and critical risk space.

A ***BDRR %deviation*** is used throughout the Report and calculated using the following formular:

BDRR% deviation = BDRR / BDRRmax x 100

Where ***BDRRmax*** = Maximum BDRR of System

The ***BDRR %deviation*** is a calculated unit of measurement of risk which indicate the variance of a BDRR value before it reaches its maximum BDRR value. This unit of measurement allows DWS to compare all sized and types of plants equally.
All water supply systems are categorised according to their risk rating placing them in one of four categories as per table below.

BDRR Categorisation:

Low	Medium	High	Critical
<50%	50%<70%	70% - <90%	90% - 100%

The higher the ***BDRR %deviation*** value, the closer the BDRR risk is to the maximum value it can obtain.

- Example 1: a 95% BDRR %deviation value means the supply system has only 5% space remaining before the system will reach its maximum critical state (100%) – this is a highly undesirable state, and the supply system is categorised as a critical risk system.
- Example 2: a 25% BDRR %deviation value means the supply system holds a low and manageable risk position and is not close to the limits that define a critical state (90-100%) – this is a desirable status and the supply system is categorised as a low risk system.

The rationale and weighting of each risk indicator is outlined below.

Risk Indicator A: Design capacity and Risk Indicator B: Operational Capacity in terms of design

Weighting factor for Criteria A and B

A = CAPACITY	
Category / Description	Weighting Factor
Unknown / Multiple sources	**6**
>25	**5**
>10 to 25	**4**
>2 to 10	**3**
>0.5 to 2	**2**
< or = 0.5	**1**
B = % OPERATIONAL CAPACITY IN TERMS OF DESIGN CAPACITY	
Category / Description	Weighting Factor
> 150% or Unknown	**5**
>100 – 150%	**4**
>50 – 100%	**3**
>10 – 50%	**2**
0 – 10%	**1**

Criterion A represents the design capacity of the treatment plant.

Every water treatment plant must be classified with DWS as per Regulation 2834. The classification of the treatment plant is based on a number of components, including size, complexity and electrical consumption, as per set criteria. The plant classification certificate is available on IRIS and supporting evidence provided by the WSA during plant registration is used to determine the risk rating for criterion A.

The risk rating is allocated according to the size of the treatment plant with higher risk rating given for a larger plant and lower risk rating for a smaller plant. The rationale is that a larger plant serves a larger community and therefore presents a higher risk if the plant is not functioning or is producing unsafe drinking water than a smaller plant which serves less people. The risk rating for criteria A remains the same provided the capacity stays the same, and all plants which have the same design capacity range will have the same maximum BDRR.

Risk Indicator B represents the % operational capacity in terms of design capacity.

The daily production versus the design capacity of the treatment plant is an important indicator to determine if the plant can provide sufficient, safe drinking water to all the consumers now and in the near future. When the plant is operating above its design capacity, major unit processes are overloaded and cannot achieve their operational limits which leads to water quality failures. Once daily production approaches 90% of design capacity, the WSA must plan, budget for and implement upgrades to the treatment facility to ensure there is sufficient supply, not only for human consumption, but also for economic activities such as mining, agriculture and industries.

Criterion B reports on the percentage operational flow in terms of design capacity. The ideal value is between 50 – 100%; higher values indicate the plant is overloaded and lower values indicate the plant is receiving too little flow which may also compromise performance due to lack of retention time (flocculation, sedimentation).

Risk Indicator C: Water Quality Compliance

In South Africa, the SANS 241:2015 is the definitive reference on acceptable limits for drinking water quality parameters and provides limits for a range of water quality characteristics and water meeting this standard is deemed safe for lifetime consumption. In addition, the SANS 241: 2015 standard stipulates the frequency of sampling as well as the number of sample points required per supply system to ensure sufficient coverage of the network. The frequency and number of required sample points is dependent on the population size as outlined in Table 1 of SANS241:2015. Monitoring compliance is therefore critical to guarantee the safety of the supply at all points in the network.

Risk Indicator C is directly linked to the safety of the drinking water in the supply systems as it reports on compliance against the microbiological and chemical determinands and on the monitoring compliance.

Risk Indicator C: Water Quality compliance = C1(70%) + C2 (30%)

Both microbiological and chemical compliance accounts for monitoring compliance to ensure compliance is based on minimum required number of samples based on population size.

Expanded Formular is **C = (C1a x C1b) + (C2a x C2b)**

Where:

- **C1: Microbiological compliance = C1a X C1b**
  - ✓ **C1a**: micro compliance, different weighting based on population size
  - ✓ **C1b**: micro monitoring compliance (MNR%) – monitoring compliance against registered programme, based on population size as per Table 2 in SANS 241-2: 2015
- **C2: Chemical compliance = C2a X C2b**
  - ✓ **C2a**: chemical compliance against all required determinands, different weighting based on population size
    - The chemical quality of the water supply must comply with the excellent requirements set by the Blue Drop Programme for all chemical-health determinands listed in the 2014 Blue Drop Limits, derived from SANS241:2006 and 2011 and includes, NO_3- and NO_2- as N, SO42-, Sb, As, Cd, Cr, Co, Cu, CN-, Pb, Hg, Ni, Se, V, DOC or TOC, and Total THM.
    - Performance assessment is based on the following:
    - Excellent Compliance (95% for <100 000 population) & (97% for >100 000 population)
    - Good Compliance (93% for 100 000 population) & (95% for >100 000 population)
  - ✓ **C2b**: chemical monitoring compliance calculated against Blue Drop requirements:
    - Actual monitoring occurs according to registered monitoring programme (>80%)
    - Number of samples: One sample each at treatment plant final and one distribution point, both of which must be analysed for at least 80% of determinands listed above (13 of the 17 determinands) i.e. at least 26 data points are required.

Weighting for Ca – water quality compliance

Ca= WATER QUALITY COMPLIANCE* Micro (70%) + Chemical (30%) compliance based on population – data from IRIS	
Category / Description	Weighting Factor
Population <100 000	
<94% or No Information	**9**
94 < 95%	**7**
95% < 96%	**5**
96% < 97%	**3**
97% < 98%	**2**
≥ 98%	**1**
Population >100 000	
<96% or No Information	**9**
96% < 97%	**7**
97% < 98%	**5**
98% < 99%	**3**
≥ 99%	**1**

Weighting for Cb - monitoring compliance

C1b: Microbiological Monitoring compliance – results provided by IRIS, based on registered monitoring programme which is aligned with the required no. of sample sites for population as per SANS 241	
Category / Description	Weighting Factor
>80%	**1**
50% - 80%	**2**
30% - 49%	**3**
<30%	**4**
C2b: Chemical Monitoring Compliance – calculated based on % of determinands monitored / total no. of determinands as per Blue Drop requirements	
Category / Description	Weighting Factor
>80%	**1**
50% - 80%	**2**
30% - 49%	**3**
<30%	**4**

Risk Indicator D: Technical Skills

Under Section 9 (1) of the Water Services Act (108 0f 1997), regulations relating to Compulsory National Standards for Process Controllers and Water Service Works stipulate the requirements for registration of all water and wastewater treatment plants. Regulation 2834 outlines the requirements for:

- Classification of water and wastewater treatment plants: based on size, complexity, and electrical consumption,
- Classification of process controllers and supervisors: based on qualifications and years of experience,
- Required number and classification of staff per shift based on the classification of the plant: more complex plants requires more skilled process controllers per shift.

Based on the shift patterns, the WSAs must align with the Regulation to ensure treatment plants are effectively operated and maintained for sustainable water services delivery.

Risk Indicator D: Technical Skills evaluates the compliance of technical staff against Blue Drop requirements as outlined below:

Technical skills evaluation as per Blue Drop requirements

Works Class	Class Of Process Controller Per Shift	Class Of Process Controller for Supervision*	Operations And Maintenance Support Services Requirements*
E	Class I	Class V*	THESE PERSONNEL MUST BE AVAILABLE AT ALL TIMES BUT MAY BE IN-HOUSE OR OUTSOURCED - electrician - fitter - instrumentation technician
D	Class II	Class V*	
C	Class III	Class V*	
B	Class IV	Class V	
A	Class IV	Class V	

**does not have to be at the works at all times but must be available at all times. If the Water Services Institution or owner of a waterwork has no person of this class employed on that work, a contractor / consultant with the required qualifications as prescribed in Schedule III in respect of that particular class of persons, shall be appointed to visit the work weekly.*

Risk indicator D is calculated from three separate components which each carry the same weighting (1/3 of total)

- Compliance for process controllers: required number and class of process controllers per shift for specific class of plant.
- Compliance for supervisor: Class V required, either at the plant or available at all times.
- Compliance for maintenance team, subdivided into 3 sections, each with equal, proportional weighting:
    - civil team: plumbing qualification / trade test.
    - mechanical team: millwright or similar mechanical qualification.
    - electrical team: electrical qualification / trade test

Weighting Factor for Criteria D

D = TECHNICAL SKILLS	
Category / Description	Weighting Factor
Supervisor + Process Controllers + Maintenance Team	**1**
Supervisor + Maintenance Team but no Process Controllers	**2**
Process Controllers + Maintenance Team but no Supervisor	
Process Controllers + Supervisor but no Maintenance Team	
Supervisor & no Maintenance Team & no Process Controllers	**3**
Process Controllers but no Maintenance Team & no Supervisor	
Maintenance Team but no Supervisor & no Process Controllers	4
No Supervisor + no Process Controllers + no Maintenance Team	**5**

Risk Indicator E: Water Safety Plans

The concept of using risk management processes to manage water supply systems effectively was introduced by the World Health Organisation (WHO) in 2004 and described as Water Safety Planning. The WHO states:

"The most effective means of consistently ensuring the safety of a drinking-water supply is through the use of a comprehensive risk assessment and risk management approach that encompasses all steps in water supply from catchment to consumer. In these Guidelines, such approaches are called water safety plans (WSPs)." (WSP Manual,2007)

Since then more than 93 countries have adopted Water Safety Planning as a method for drinking water quality management with more than 70 countries having policies and regulations requiring Water Safety Plans.

In South Africa, the WaSP is a requirement for Blue Drop Certification with a scoring of 35% for comprehensive WSP and response monitoring. The National Drinking Water Standard, SANS241:2015 is closely aligned with the Water Safety Plans risk based approach with following specifications to ensure delivery of safe drinking water at all times:

Water quality risk assessment:

- At least annually or when quality changes
- Identify problem determinands + increase frequency of monitoring for problem determinands based on level of risk
- Risk-based monitoring programme unique to each supply system
- Routine compliance monitoring: based on population size and area
- Response monitoring: Incident Management Protocol to address incidents
- Verification of water quality: calculation of indices
- Water Safety Plan: adopt and implement

The Water Safety Plan is therefore a critical component of drinking water management and forms part of the BDRR calculation.

Risk Indicator E evaluates the following three critical components which are required for effective risk management:

- Completeness of the WSP as per World Health Organisation Water Safety Planning Manual,
- Development and adoption of risk-based monitoring programme as per SANS 241:2015, and
- Proof of implementation of the findings of the WSP to ensure there is continuous risk management and movement towards an overall lower risk rating.

The requirements are divided into 11 sub-elements that are evaluated to calculate the risk rating for this indicator as illustrated below.

Weighting Factor for Criteria E

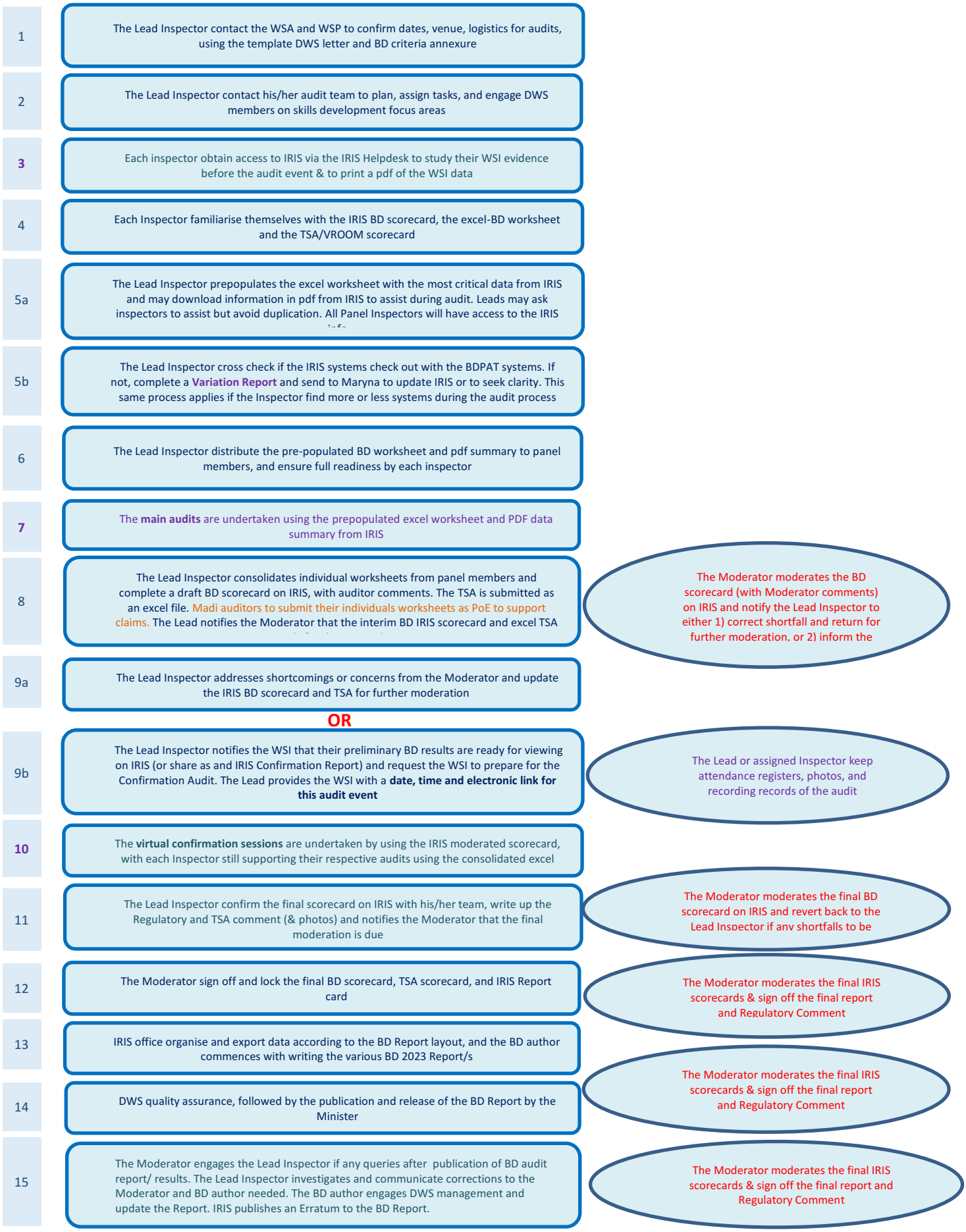
E – WATER SAFETY PLAN	
i. Signature from Technical Director / Municipal Manager, ii: Risk prioritisation method, iii: Risk assessment of catchment, iv: Risk assessment of plant, v: Risk assessment of network, vi: Final risk rating, vii: Mitigating measures for all high and medium risks. viii: Full SANS 241 analysis of raw and final water, ix: Identification of risk determinands, x: Addition of risk determinands to monthly compliance monitoring as per SANS 241 - frequency based on category of risk (acute/chronic/aesthetic) xi: Proof that >25% of mitigating measures have been implemented – proof in form of purchase order, pictures, water quality results, tender document, etc	
Description	Weighting Factor / Calculation
No WSP	5
WSP contains X sub- elements	5 – (X / 55)
Note: if shortcomings for any of the sub-elements, then a higher risk rating is given.	

D. Multiple systems

In many supply systems, there are more than one source of water and more than one water treatment plant. These multiple sources will all feed into one network and will therefore be combined. To calculate the BDRR for such multiple systems, the input data sheet makes allowance for selection of multiple systems. A BDRR score is then completed for each water source/treatment plant i.e. scores for A, B, C, D and E are calculated for each water source/treatment plant. A combined BDRR score is then calculated based on the proportion of flow supplied by each water source/treatment plant.

In summary, a proportional scoring is given for each risk indicator and for the system as a whole based on quantity of water provided by each water source/treatment plant.

ANNEXURE B: BLUE DROP AUDIT PROCESS FLOWCHART



ANNEXURE C: GUIDE TO READING THE REPORT CARD

The following is an example of a typical report card that appears in the Blue Drop Report 2023. Results are provided in colour coded format – each colour has a specific meaning and performance reference.

Municipal Blue Drop Score		
Blue Drop Score 2023	**%**	**82%↑**
Blue Drop Score 2014	**%**	**64%**
Blue Drop Score 2012	**%**	**45%**
Blue Drop Score 2011	**%**	**26%**

The WSI BD score is a **Performance Indicator** of the overall water business of the organisation. See colour legends below.
Arrows: Depict the current BD status of the plant. A ↑ arrow shows improvement, ↓ shows digress, → shows unchanged situation

Key Performance Area	Weight	System Name
Bulk/ WSP		<Name>
Capacity Management	15%	100%
DWQ Risk Management	20%	86%
Financial Management	10%	72%
Technical Management	20%	76%
DWQ Compliance	35%	70%
Bonus	10%	80%
Penalties	10%	0%
Disqualifiers		None
Blue Drop Score 2023	**%**	**82%**
Blue Drop Score 2014	%	**64%**
Blue Drop Score 2012	%	**45%**
Blue Drop Score 2011	%	**26%**
System Design Capacity	kl/d	28,000
System Available Capacity	kl/d	28,000
System Input Volume	kl/d	20,000
Capacity Utilisation (%)	Kl/d	77%
Average Daily Consumption ()	l/p/d	176
Resource Abstracted From		Mhlongo River
Microbiological Compliance	%	98%
Chemical Compliance	%	97%
Risk Defined Compliance	%	95%
VROOM	Rand	R12,831,000
BDRR 2023	%	71%
BDRR 2022	%	76%

Colour codes		Appropriate action by institution
	≥95-100%	Excellent situation, need to maintain via continued improvement
	80-<95%	Good status, improve where gaps identified to shift to 'excellent'
	50-<80%	Average performance, ample room for improvement
	31-<50%	Very poor performance, need targeted turnaround interventions
	0-<31%	Critical state, need urgent intervention for all aspects of the water services business

A system is disqualified from BD Certification if it defaulted to respond to a Notice/Directive

The final BD score - same colour legends as above

WTW Outflow to the WSS or Daily Treated Flow/ Operational Capacity

Capacity Utilisation calculated as dividing the SIV ty by the system Available Capacity

Water Use Efficiency calculated by dividing the SIV by the Population (see legend below)

DWQ compliance with SANS 241:2015 and the BD requirements as audited under KPA 5. A system is disqualified from BD Certification if microbiological and/or chemical compliance not "Excellent" status

WUE (l/cap/day) performance categories

	>300	Extremely high per capita water use
	250-300	Poor per capita water use
	200-250	Average per capita water use with potential for marked improvement
	150-200	Good per capita water use but some improvement may be possible subject to economic benefit
	<150	Excellent per capita water use management

%BDRR/BDRR max legend:

Low	Medium	High	Critical
<50%	50%<70%	70% - <90%	90% - 100%

Understanding the drop representation for each supply system

Quality of Drinking Water Drop Definition	
Colour Drop	**Indication of Drop**
	**Blue Drop Certified**
	**Water complied excellently with standard; safe to drink** **Micro >97%** **Chemical >95%**
	**Water safe to drink but some chemical parameter compliance required improvement** **Micro >97%** **Chemical <95% (or no information)**
	**Water generally safe to drink but with recorded some microbiological failures** **Micro <97%** **Chemical >95%**
	**Water did not comply according to expected standard targets** **Micro >90% but <95%** **Chemical >90% but <95%**
	**Compliance levels too low; there were extended periods when the water did not comply with standard / or no monitoring to confirm actual quality of tap water** **Micro <90%** **Chemical <90%**

ANNEXURE D: ACRONYMS

ACRONYMS	DESCRIPTION	ACRONYMS	DESCRIPTION
AC	Asbestos Cement	**NI**	No Information
AGSA	Auditor General of South Africa	**NGO**	Non-Government Organisation
BD	Blue Drop	**NLA**	National Laboratory Association
BDC	Blue Drop Certification	**NQF**	National Qualifications Framework
BDPAT	Blue Drop Progress Assessment Tool	**NT**	National Treasury
BDRR	Blue Drop Risk Rating	**NTU**	Nephelometric Turbidity Units
BH	Borehole	**NWA**	National Water Act 36, 1998
BWS	Bulk Water Supplier	**NRW**	Non-Revenue Water
CAP	Corrective Action Plan	**O&M**	Operation and Maintenance
CAPEX	Capital Expenditure	**OHS**	Occupational Health and Safety
CBD	Central Business District	**OPEX**	Operating Expenditure
CBO	Community Based Organisation	**PA**	Process Audit; Performance Agreement
CFO / CEO	Chief Financial/Executive Officer	**PC**	Process Controller
COGTA	Cooperative Government and Traditional Affairs	**PMFA**	Public Financial Management Act
CRR	Cumulative Risk Ratio; Capital Replacement Reserve	**PMU**	Project Management Unit
CSIR	Council for Scientific and Industrial Research	**PoE**	Portfolio of Evidence
CVW	Central Vaal Water (formerly Bloem Water)	**PrPC**	Professional Process Controller
DAV	Dissolved Air Flotation	**PTS**	Participatory Testing Scheme
DBSA	Development Bank of Southern Africa	**R**	Rand
DCG/DCOG	Department of Cooperative Governance	**RBIG**	Regional Bulk Infrastructure Grant
DHS	Department of Human Settlements	**Reg**	Regulation
DM	District Municipality	**RO**	Reverse Osmosis
DPW	Department of Public Works	**RR**	Risk Register
DWQ	Drinking Water Quality	**RW**	Rand Water
DWS	Department of Water and Sanitation	**RWSS**	Rural Water Supply System
ECSA	Engineering Council of South Africa	**SACNASP**	South African Council for Natural Scientific Professions
EDAMS	Water Management Engineering Management and Design System	**SAHRC**	South African Human Rights Commission
FAR	Fixed Asset Register	**SALGA**	South African Local Government Association
FY	Financial Year	**SANAS**	South African National Accreditation System
GD	Green Drop	**SANS/SABS**	South African National Standards/ Bureau of Standards
GG	Government Gazette	**SCADA**	Supervisory Control and Acquisition Data
GVR	General Valuation Roll	**SCM**	Supply Chain Management
HOD	Head of Department	**SHEQ**	Safety Health Environment Quality
HRM	Human Resource Management	**SIV**	System Input Volume
IAM	Infrastructure Asset Management	**SLA**	Service Level Agreement
IDP	Integrated Development Plan	**SWPN**	Strategic Water Partners Network
IMP	Incident Management Protocol	**The Act**	Water Services Act 108, 1997
IMQS	Infrastructure Management Quality Solutions/Software	**TSA**	Technical Site Assessment
IR	Incident Register	**UPS**	Utility Power Supply
IRIS	Integrated Regulatory Information System	**USDG**	Urban Settlements Development Grant
ISO	International Standards Organisation	**VROOM**	Very Rough Order Of Measurement/Magnitude
IWA	International Water Association	**VSD**	Variable Speed Drive
KPA	Key Performance Area	**WaSP**	Water Safety Plan
kl	kilo litre	**WAL**	Water Abstraction License
km	kilo metre	**WB**	Water Board
kWh	kilo Watt hour	**WCDM**	Water Conservation Demand Management
L/c/p or L/p/d	Litres per person/capita per day	**WF**	Weighting Factor
LM	Local Municipality	**WHO**	World Health Organisation

ACRONYMS	DESCRIPTION	ACRONYMS	DESCRIPTION
MCPP	Municipal Capability and Partnership Programme	**WISA**	Water Institute of South Africa
MFIP	Municipal Financial Improvement Programme	**WQ**	Water Quality
MFMA	Municipal Financial Management Act	**WQMS**	Water Quality Management System
MIG	Municipal Infrastructure Grant	**WRC**	Water Research Commission
MINMEC	Ministers and members of Executive Councils Meeting	**WSA**	Water Services Authority; Water Services Act
MISA	Municipal Infrastructure Support Agent	**WSDP**	Water Services Development Plan
Ml	Mega litre	**WSP**	Water Services Provider
Ml/d	Mega litres per day	**WSI**	Water Services Institution
MM	Metropolitan Municipality; Municipal Manager	**WSIG**	Water Services Infrastructure Grant
MSA	Municipal Structures Act	**WSIP**	Water Services Improvement Programme
MTEF	Medium Term Expenditure Framework	**WSS**	Water Supply System
MWH	Mega Watt Hour	**WTP/W**	Water Treatment Plant/Works
NA	Not Assessed or Not Applied	**WUA**	Water Use Authorisation
ND	No Drop	**WUE**	Water Use Efficiency
NDP	National Development Plan	**WUL**	Water Use License
PROVINCE			
FS	Free State		

ANNEXURE E: LIST OF TABLES

ANNEXURE F: LIST OF FIGURES

City of Johannesburg and Rand Water: Clean and well maintained pumpstation at Illovo Reservoir

Rand Water: Upgrading of bulk water pipelines to meet current and future demand *(open source)*